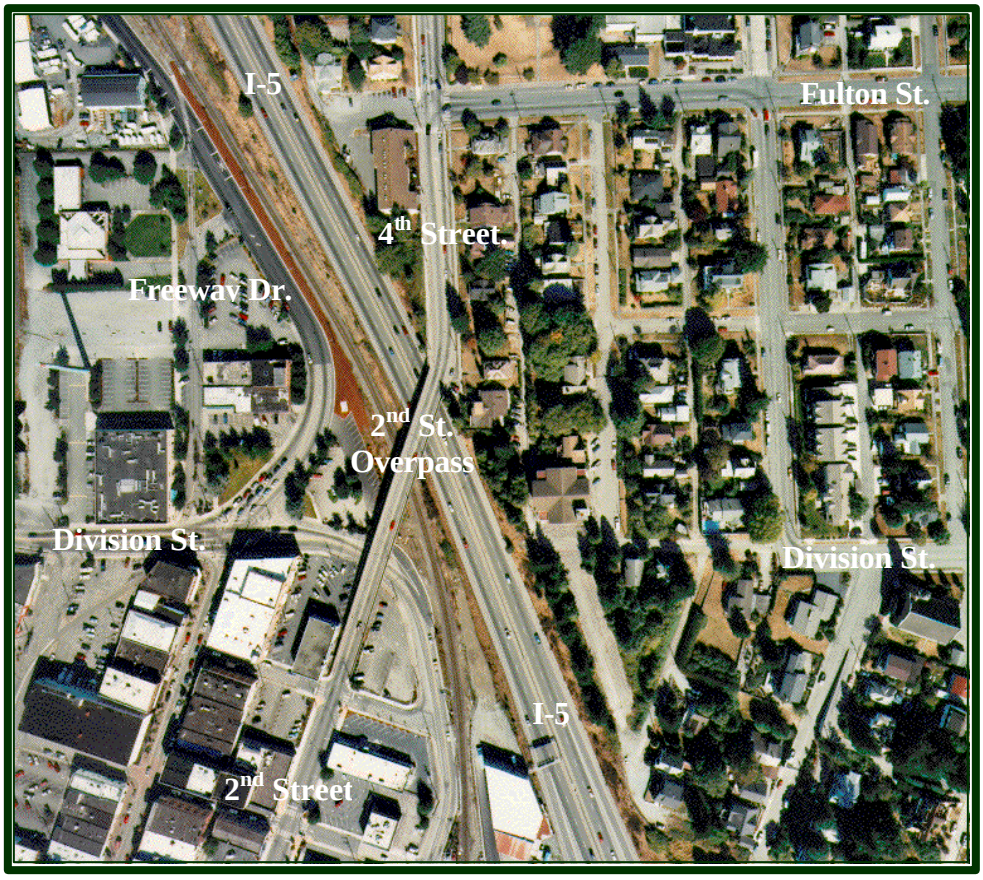
FINAL

I-5 PRE-DESIGN REPORT

ANDERSON ROAD TO COOK ROAD

Y-7059 / 0L3481

I-5 CORRIDOR STUDY
&
SECOND STREET OVERPASS ANALYSIS



Prepared For:

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
NORTHWEST REGION, MOUNT BAKER AREA

Prepared By:

H.W. LOCHNER, INC.

In association with

CivilTech Corporation
Dames & Moore, Inc.
Infrastructure Consulting Corporation
John Clark, P.E. Consulting Engineer
Pacific Rim Resources, Inc.

JUNE 16, 2000

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I-5 CORRIDOR STUDY
&
SECOND STREET OVERPASS ANALYSIS

This planning-level (pre-design) study was designed to begin the process of addressing the deficiencies associated with the Second Street Overpass and the mobility improvement along the I-5 corridor in Central Skagit County. This pre-design study reviewed existing and future travel conditions along the I-5 corridor in the Mount Vernon / Burlington area and identified alternatives through an agency and public involvement process. The study defined and analyzed the alternatives in a sketch planning process using key criteria identified through the agency and public involvement process. The analysis results were then presented to the public and local agencies for comment. Based on the analysis and comments received, recommendations for the most promising alternatives for more detailed engineering and environmental assessment were developed and presented to the project Steering Committee. A summary of the overall sketch-planning process and the Steering Committee recommendations were presented to the Skagit Sub-RTPO Technical Committee and Policy Board for approval.

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STUDY PURPOSE AND NEED

The Washington State Department of Transportation (WSDOT) 1999-2018 State Highway System Plan (SHSP) has identified the need to modify or replace the Second Street Overpass in Mount Vernon. The physical condition of the Second Street Overpass has been deteriorating in recent years and has the lowest vertical clearance (approximately 14.3 feet) along the I-5 corridor in Washington, limiting the movement of large or oversize vehicles. This structure is also not in conformance with current interstate design standards and needs to be upgraded for earthquake safety. Before the new Second Street Overpass can be designed, the future width of I-5 and SR 536 needs to be determined.

In recent years, Skagit County's central area has experienced increasing traffic congestion on I-5 that is expected to continue in the future and result in a low service rating with insufficient capacity to meet local and regional traffic demands, efficiently and safely. In light of these future problems, the SHSP identified a future capacity deficiency on Interstate 5 through the Mount Vernon / Burlington urban area and included possible solutions as part of the "Mobility Strategies Excluded from Constrained Plan" improvements.

In response to these issues, this pre-design study was designed to determine the most promising method or concept for the rehabilitation or replacement of the Second Street Overpass and to identify feasible I-5 Corridor alternatives that should be carried forward for more detailed environmental and engineering assessment.

STUDY PROCESS

The WSDOT Mount Baker Region Planning Office initiated a planning-level (pre-design) study to identify the most promising alternatives that would solve the Second Street Overpass and I-5 Corridor deficiencies. The study area for this Pre-Design Study extends from the vicinity of the I-5/Hickox Road Interchange on the south to the I-5/Cook Road Interchange on the north. Work in this pre-design study included the review of existing and future travel conditions along the I-5 corridor in the central county area to document the purpose and need for the improvements. Possible alternatives were identified to replace the existing Second Street Overpass and to improve mobility along I-5 in central Skagit County through an agency and public involvement process. The study analyzed the alternatives in a sketch-level planning process using key criteria identified through the agency and public involvement process. Results were then displayed for public and agency comment. Based on the analyses and comments received, recommendations for the most promising alternatives for more detailed assessment were developed.

STUDY RECOMMENDATIONS

The following are the key study recommendations for the Second Street Overpass Analysis and the I-5 Corridor Alternatives Study.

- **Second Street Overpass Improvements –** A **Modified Same Alignment Alternative** is recommended for more detailed engineering and environmental analysis. The Mount Vernon City Council at their April 26, 2000 meeting selected the Modified Same Alignment Alternative as their preferred choice. The project Steering Committee, the Skagit Sub-RTPO Technical Committee and the Skagit Sub-RTPO Policy Board concurred with this recommendation of the Modified Same Alignment Alternative as the preferred alternative.

  The **Modified Same Alignment Alternative** was recommended because it requires less new right-of-way, provides a smoother alignment and the closure time of 8 to 12 months was considered reasonable. The **North-side Alignment Alternative** is also recommended for

further analysis because it further minimize traffic closure time and provides an alternative if the closure time for the Modified Same Alignment Alternative is substantially increased. The roadway geometry along both of these alignments is acceptable and their capital costs are estimated at approximately $10 million. They also received the highest public ratings during the public Open House.

It was also recommended by the Skagit City Council and concurred by the Skagit Sub-RTPO Policy Board and Technical Committee that the new Second Street Overpass structure design should be design to allow the reconstruction of I-5 as a six-lane facility with a wide median. This recommendation will provide sufficient space in the median to add two additional lanes for future use without reconstructing the new Second Street Overpass again. These considerations will require the new Second Street Overpass to clear span the existing four-lane I-5 roadway section to allow sufficient space to construct the I-5 corridor improvements.

The proposed roadway cross-section on the new second Street Overpass structure will consist of three 12-foot lanes, two 6-foot sidewalks, and two 5-foot bike lanes for a total of 60 feet.

An example of the **Modified Same Alignment Alternative** is illustrated in Figure S-1. A possible example of the **North-side Alignment Alternative** is illustrated in Figure S-2.

- **I-5 Corridor Mobility Improvements –** Based on the I-5 Alternatives Analysis conducted as part of this study, the project Steering Committee determined that additional detailed traffic, geometric, environmental and right-of-way studies need to be completed before they could recommend a long range improvement plan for the overall I-5 corridor through Central Skagit County. The Skagit Sub-RTPO Policy Board and Technical Committee concurred with this recommendation for additional engineering and environmental analysis. However, no funds are currently available to conduct these detailed studies.

  Based on the information available, only the **I-5 Widening Alternative with a Wide Median Option** to allow sufficient space for eight travel lanes on I-5 met the primary objective of this study. However, more analysis of the detailed traffic and environmental impacts are needed before this alternative can be recommended. As a result, the project Steering Committee was not able to select the most promising alternative to improve the long-range mobility along the I-5 corridor through the Mount Vernon/Burlington area.

  It was recommended by the project Steering Committee that any selected I-5 mobility alternative incorporates the appropriate TSM/TDM improvements into it.

PROJECT NEXT STEPS

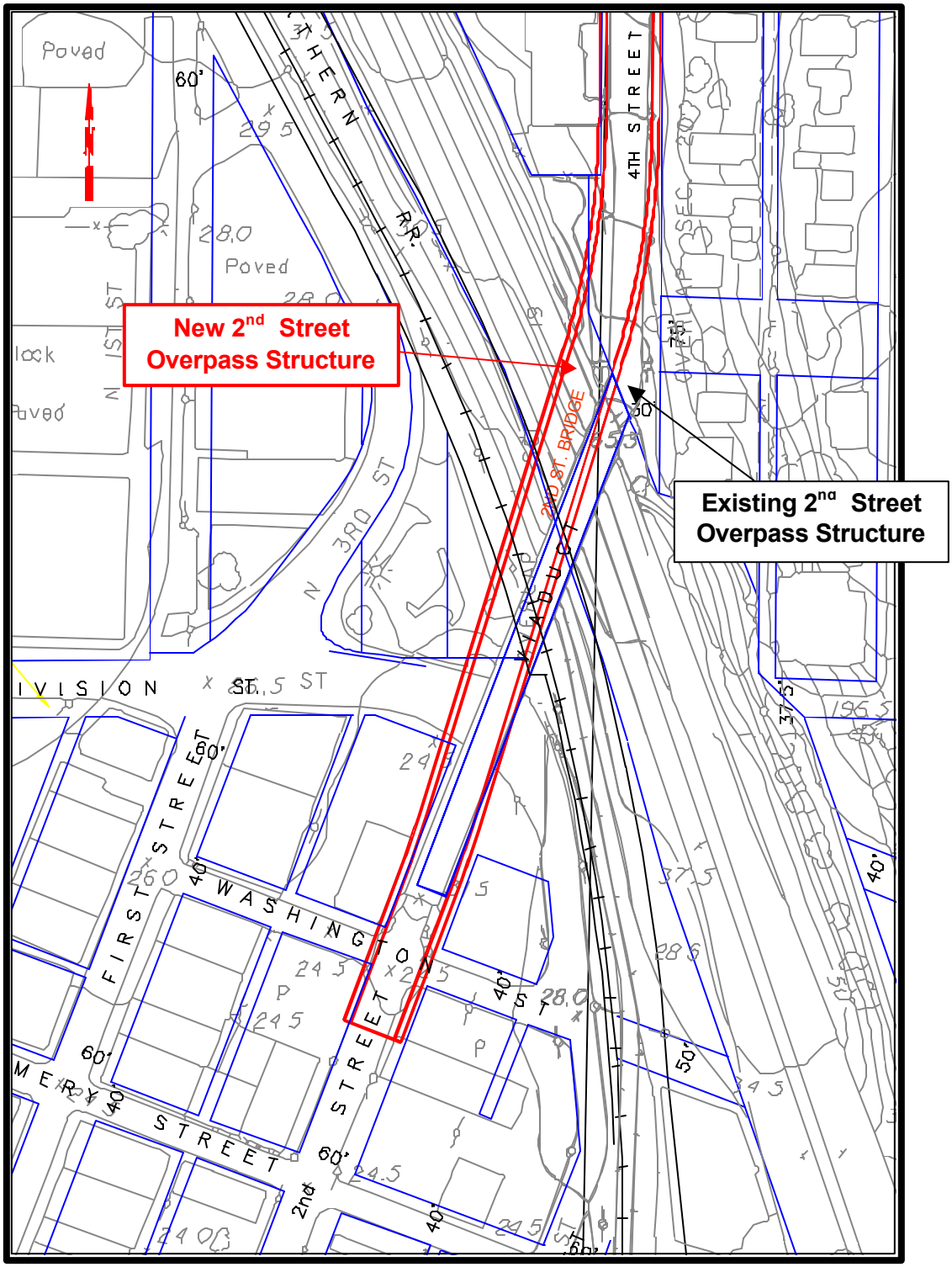
Several steps need to be taken to implement the recommendations of the project Steering Committee. Some of the key elements that need to occur are summarized below for both the Second Street Overpass Replacement and the I-5 Corridor Mobility Improvements.

Second Street Overpass Replacement

Various key tasks need to be accomplished to finalize the recommendations of this report. A design file needs to be prepared in accordance with the requirements set forth in WSDOT's *Design Manual* to identify design issues and solutions, right-of-way needs, geometric alignment details, type of structure, and foundation elements. A detailed environmental assessment needs to be conducted to meet federal and state requirements and endangered species compliance. An overall public involvement plan and agency coordination program needs to be developed for use throughout the design/environmental

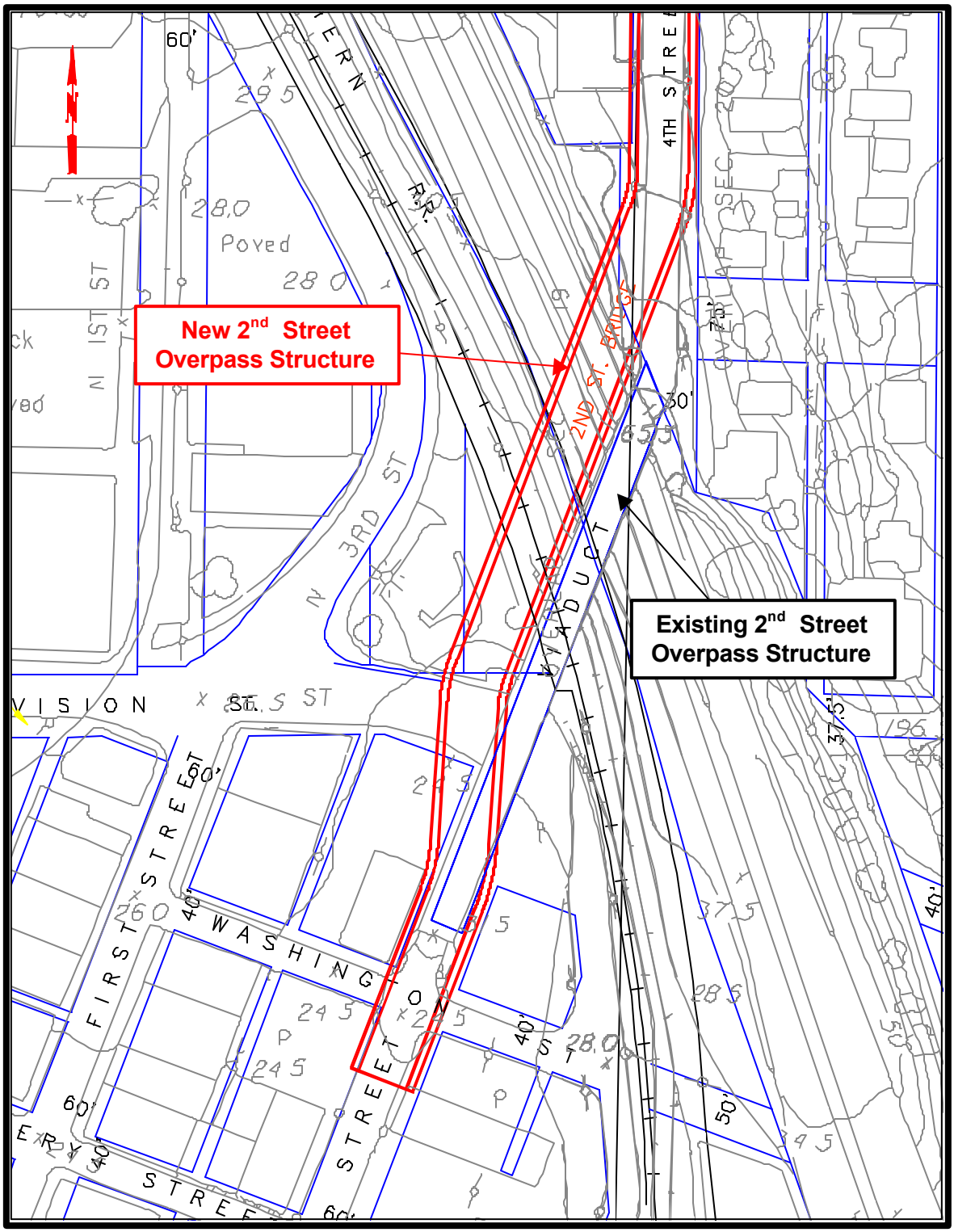
Figure S-1

NEW SECOND STREET OVERPASS STRUCTURE ON A MODIFIED SAME ALIGNMENT



Source: CivilTech Corporation

Figure S-2
NEW SECOND STREET OVERPASS STRUCTURE ON NORTH-SIDE ALIGNMENT



Source: CivilTech Corporation

process and through construction of the new overpass. This process for the development of the new Second Street Overpass structure can proceed faster than the mobility improvements for the I-5 corridor because some funds are currently available for design and right-of-way.

I-5 Corridor Improvements

In light of current economic conditions and budgetary constraints, it is recognized that no funding will be available in the near future to complete the sketch planning analysis started in this study and select the most promising alternative to improve mobility on I-5 through the Central Skagit County area. However, over the next 20 years, land use development is expected to intensify in the region, particularly along the I-5 corridor. As a result, it is recommended that WSDOT, Skagit Council of Governments and local agencies work together to conduct follow-up detailed studies that refine the alternatives, with sufficient accuracy, to select a preferred mobility strategy and to identify which parcels of land need to be preserved from more intense development. In addition, a community and agency involvement program should be developed and funding strategies investigated.

Local Agency Activities

Local agencies will continue to play an important role in shaping the future transportation system in Skagit County. In particular the Skagit/Island RTPO, local cities and Skagit County's continued involvement and support for regional transportation improvements can influence the priority of state projects and obtain needed funds. In addition, the cities and county should also consider the benefits of an Arterial By-Pass with a new Skagit River crossing to improve local mobility and reduce short trip dependence on the freeway system in updating their comprehensive transportation plans.

INTRODUCTION

The Washington State Department of Transportation (WSDOT) 1999-2018 State Highway System Plan (SHSP) has identified the need to modify or replace the Second Street Overpass in Mount Vernon in their SHSP. The physical condition of the Second Street Overpass has been deteriorating over the past years and has the lowest vertical clearance (approximately 14.3 feet) along the I-5 corridor in Washington. The bridge is also not in conformance with current interstate design standards and needs to be upgraded for earthquake safety.

A future capacity deficiency on Interstate 5 through the Mount Vernon / Burlington urban area was also been identified in the SHSP. In recent years, Mount Vernon and Burlington communities have experienced increasing traffic congestion on I-5. As the primary thoroughfare in the vicinity, it carries not only regional traffic, but also local traffic, freight and other vehicles moving north and south to both recreational and commercial destinations throughout the region. With projected increases in traffic in coming years, the current carrying capacity of the highway will not be sufficient to serve future traffic efficiently and safely.

As Skagit County's population and economy grow and traffic through the area increase, travel on I-5 is expected to significantly increase over the next 20 years. From area traffic forecasts, afternoon peak hour traffic on I-5 over the Skagit River Bridge is expected to increase from about 4,960 vehicles in 1997 to about 8,900 vehicles or more by 2020. If nothing is done, this increased traffic demand will slow overall travel speeds, increase congestion and potentially result in more accidents. At the same time, traffic on parallel arterials, such as Riverside Drive and Burlington Boulevard, will also increase.

Since these two projects affect the same corridor and that the decision of one project affected the other, it was decided that both projects be combined into a single study to determine the most promising alternative(s) that best meets the purpose of each project. The preferred alternative(s) should then be carried forward for more detailed engineering and environmental analysis.

PURPOSE OF STUDY

This Pre-Design Study was designed to address the following deficiencies and needs in a sketch-planning level approach:

- To analyze the Second Street Overpass in Mount Vernon, determine the proper method of rehabilitation, modification or replacement and identify the most promising method or concept for the rehabilitation or replacement of the Second Street Overpass. The span lengths for the design of the final concept for any improvement of the Second Street Overpass will depend on the future number of traffic lanes on I-5 through the Mount Vernon / Burlington area.
- To analyze various corridor alternatives that improve mobility on I-5 through the Mount Vernon / Burlington area in a sketch-planning level approach and identify feasible alternatives that should be carried forward for more detailed environmental and engineering assessment.

STUDY PROCESS

The WSDOT Mount Baker Region Planning Office has defined a planning-level (pre-design) study to begin the process of addressing these deficiencies and needs. The pre-design study reviewed existing and future travel conditions along the I-5 corridor in the Mount Vernon / Burlington area and identified alternatives through an agency and public involvement process. The study defined and analyzed the alternatives in a sketch planning process using key criteria identified through the agency and public

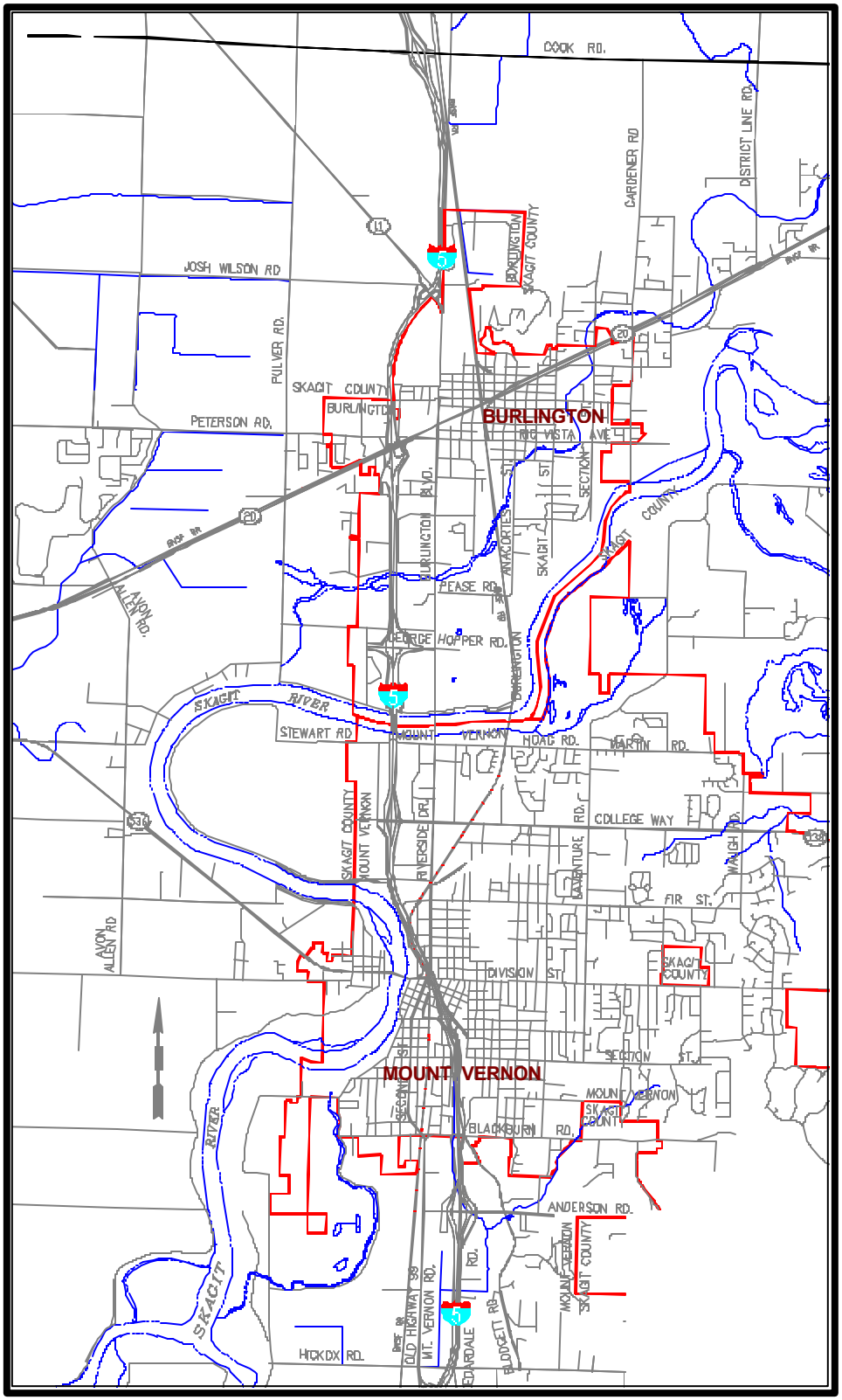
involvement process. The analysis results were then presented for public and agency comment. Based on the analysis and comments received, recommendations for the most promising alternatives for more detailed engineering and environmental assessment were developed and presented to the project Steering Committee. A summary of the overall sketch-planning process and the Steering Committee recommendations were presented to the Skagit Sub-RTPO Technical Committee and Policy Board for approval. The alternatives, analysis, findings and recommendations are documented in this Pre-Design Report.

STUDY AREA

The Mount Vernon and Burlington communities are located in Central Skagit County. It is in a region that has been largely dependent on agriculture. In recent years, however, more people are moving to both communities and commuting to Everett or nearby cities to work. There are concerns among members of the community about the increase in traffic, and also concerns in regards to protecting the existing farmland. There also is strong interest in the community for investigating alternative means of increasing traffic mobility including developing an efficient public transit system.

There are some geographical constraints to mobility in the area. The highway bisects the community of Mount Vernon causing difficulty, particularly for bicycles or pedestrians, to cross to the other side of town. The Skagit River presents another constraint to traffic circulation, as a bridge must often be used. The study area for this Pre-Design Study extends from the vicinity of the I-5/Hickox Road Interchange (MP 223.95) on the south to the I-5/Cook Road Interchange (MP 232.83) on the north, as shown on Exhibit 1.

EXHIBIT 1
Study Area Map



EXISTING AND FUTURE I-5 CORRIDOR CONDITIONS

The study area is comprised of the cities of Mount Vernon, Burlington and Sedro Woolley and a portion of Skagit County. The principal transportation system in the study area is composed of several major highways, local and regional transit service, and inter-city passenger rail service. The primary highways in the study include I-5, SR 20, SR 536, SR 538 (College Way), SR 9 and Old Highway 99 (Riverside Drive and Burlington Boulevard) as well as other major city and county roads. Skagit Transit (SKAT) is the local bus transit provider with intra-county as well as special transit routes to Everett. Amtrak operates the Seattle-Vancouver, BC inter-city passenger rail service through this corridor.

I-5 EXISTING CONDITIONS

An inventory and analysis of the physical conditions of the I-5 facility as well as the existing and future (2020) traffic conditions on I-5 are summarized in the sections below. The findings of the Skagit County I-5/Riverside Drive Origin/Destination Study, conducted in conjunction with this pre-design study, are also summarized.

Physical Conditions

The existing I-5 is a four-lane, divided, limited access facility. The section of I-5 between Hickox Road and Cook Road was designed and constructed in the early 1950's as part of the interstate system. Conditions are mostly urban between Anderson Road to SR 20 and mostly rural in the study area south of Anderson Road and north of SR 20. The terrain through the study area is mostly level to rolling. A 60-mph speed limit is posted along I-5 through most of Mount Vernon while a 70-mph speed limit is posted in the other sections of the project area.

Roadway Sections - There are two basic types of roadway cross-sections within the project limits. One cross-section includes an unpaved median strip and the other has a concrete median barrier instead of the unpaved median strip. Each consists of two southbound lanes with shoulders and two northbound lanes with shoulders. The shoulders at the median are paved four feet wide. The outer shoulders are paved ten feet wide. Each travel lane is 12-feet wide. The unpaved median strip is approximately 16-feet wide and the total roadway width is approximately 108-feet except at transition areas, under-crossings and ramp areas. The cross-section with unpaved median transitions from six lanes at the beginning of the interchange at Hickox Road to four lanes. The beginning of the transition from six lanes to four lanes marks the beginning point for this project. The total roadway width for the cross-section with concrete median barrier is approximately 80 feet. These cross-section dimensions comply with interstate requirements for four lane roadways. However, shoulder widths on some of the bridges and under-crossings within the project limits are less than the roadway cross-sections and do not meet current standards.

The roadway cross-sections between Hickox Road and Blackburn Street and between George Hopper Road and Cook Road have generally low embankment height with a 4:1 or flatter slopes and the existing right of way is sufficient to meet clear zone requirements. The clear zone generally appears to be free of obstructions and thus guardrails for the embankments are generally not warranted except at bridge ends. There are median double beam guardrails in a segment from I-5/George Hopper Road interchange to the I-5/SR 11 interchange.

The roadway cross-section between Blackburn Street and Cameron Way has a paved median with a concrete median barrier. This segment is constricted by hillside on the east and by wetlands, railroad,

and development on the west. The conditions along the west edge of the southbound roadway vary. Along the east side for most of this segment, the condition is a steep embankment topped with beam guardrail. The guardrail changes to retaining walls topped by concrete barrier in the most constricted locations.

The roadway cross-section between the railroad/Cameron Way over-crossing and George Hopper Road has a paved median with concrete median barrier. The roadway cross-section in this area has generally low embankment height with a 4:1 or flatter slopes and the existing right of way is sufficient to meet clear zone requirements. The embankment is higher and steeper near the railroad/Cameron Way over-crossing. The steep embankment is topped with beam guardrail. The guardrail is replaced by retaining walls topped by concrete barrier close to the over-crossing.

Bridges - There are 14 existing bridge structures along I-5 within the project limits. Seven are under-crossings of other roadways, four are over-crossings of other roadways, two are crossings over minor streams, and one river crossing. The seven I-5 under-crossings pass beneath the following roads:

- Hickox Road
- Anderson Road
- Blackburn Road
- Second Street/Fourth Street
- George Hopper Road
- SR 11
- Cook Road.

Two of these under-crossings, Blackburn Road and Second Street, have serious vertical clearance problems from I-5.

The four I-5 over-crossings pass over:

- Kincaid Street
- Railroad Crossing/Cameron Way
- College Way
- SR 20.

The two I-5 stream crossings include structures over Gage Slough and Joe Leary Slough. The one I-5 river crossing is over the Skagit River. The existing Skagit River Bridge is a truss type that cannot be easily widened.

Existing I-5 Traffic Conditions

The 1997 I-5 traffic volumes for the study area were recorded by WSDOT in their 1997 Annual Traffic Report and converted to afternoon peak hour conditions using 24-hour counts on I-5 between SR 20 and SR 11. Based on this data, the average two-way afternoon peak hour volume on I-5 ranges from about 3,200 vehicles between SR 20 and Cook Road to about 4,960 over the Skagit River Bridge. The findings from a capacity analysis of the existing I-5 traffic conditions, using the 1998 Highway Capacity Software based on the Transportation Research Board Special Report 209, is summarized in Table 1.

The level of service (LOS) objectives that WSDOT has adopted for urban roadways and freeways is LOS "D". For rural roadways and freeways, the service objective is set at LOS "C". By comparing these service objectives with the existing 1997 service conditions along I-5 in the study area, the

various segments of I-5 are at or near the threshold for these objectives. The critical segment on I-5 is between College Way and George Hopper Road where the existing northbound volume during the afternoon peak hour averages about 2,629 vehicles. This section of I-5 has a current rating of LOS "D". However, a 15 percent increase in traffic volume would exceed the service objective for urban area and change the rating to LOS "E". Assuming current growth rates this could occur by 2001/2002 or when the northbound peak hour volume reaches approximately 3,015 vehicles.

TABLE 1
I-5 1997 AFTERNOON (PM) PEAK HOUR TRAFFIC VOLUMES AND LEVEL OF SERVICE

	1997 I-5 EXISTING CONDITIONS 4-LANE ROADWAY											
	Southbound						Northbound					
Cross Streets	Peak Hour Volume (vehicles)	Service Flow Rate (pc/hr/ln)	Adjusted Free-Flow Speed (mph)	Average Pass. Car Speed (mph)	Density (pc/mi/ln)	LOS	Peak Hour Volume (vehicles)	Service Flow Rate (pc/hr/ln)	Adjusted Free-Flow Speed (mph)	Average Pass. Car Speed (mph)	Density (pc/mi/ln)	LOS
Cook Rd.	1,504	1,004	65.5	65.5	15.3	B	1,696	1,112	64.0	64.0	17.4	C
SR 11	1,617	1,078	65.5	65.5	16.5	C	1,823	1,194	64.2	64.2	18.6	C
SR 20	2,143	1,429	65.2	65.2	21.9	C	2,417	1,584	64.4	63.9	24.8	D
G. Hopper Rd.	2,331	1,554	65.1	64.6	24.1	D	2,629	1,723	64.6	63.7	27.1	D
College Way	2.181	1.453	64.0	64.0	22.7	C	2.459	1.612	64.8	64.2	25.1	D
Kincaid St.	2,030	1,352	64.4	64.4	21.0	C	2,290	1,501	65.5	64.9	23.1	C
Anderson Rd.	1,880	1,254	64.6	64.6	19.4	C	2,120	1,390	65.5	65.5	21.2	C
Hickox Rd.												

Source: WSDOT and H.W. Lochner, Inc.

Skagit County I-5/Riverside Drive Origin Destination Study

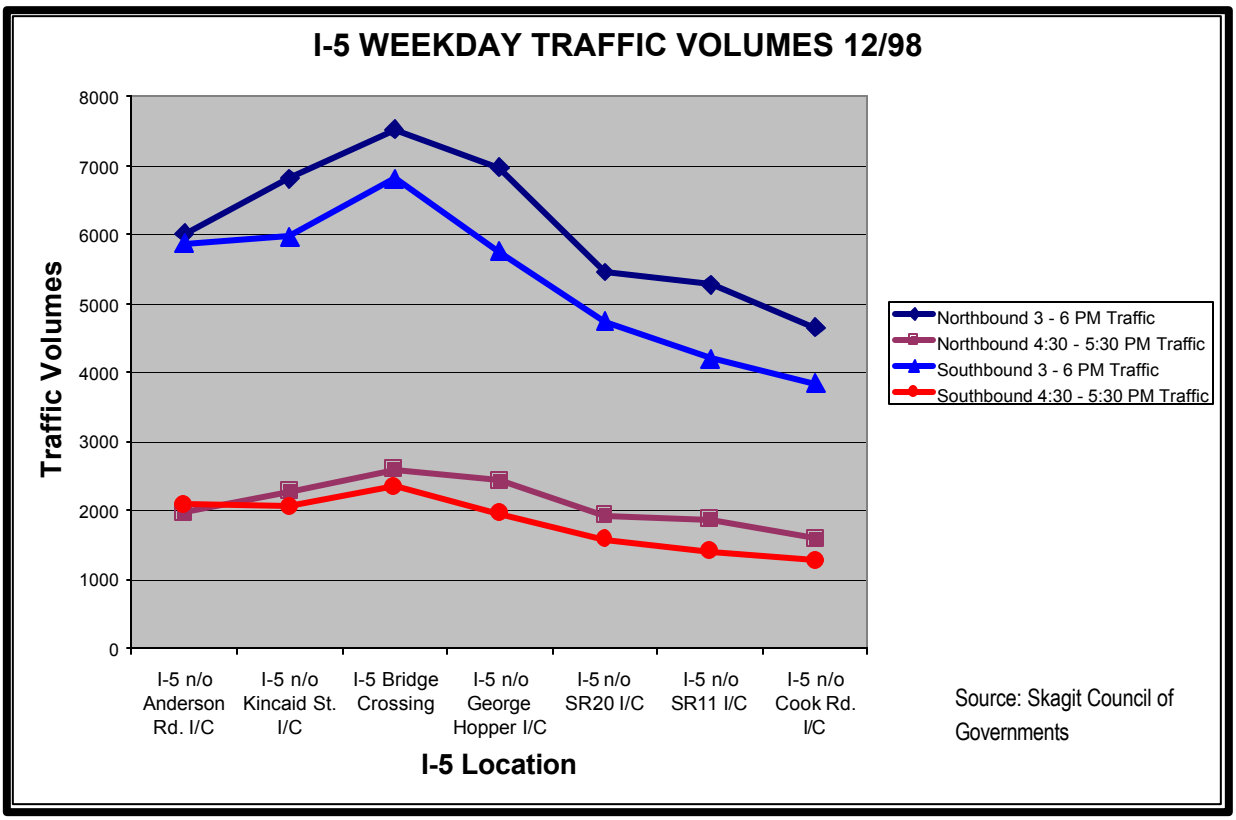
The Skagit I-5 Origin Destination (OD) Study was authorized specifically to provide a greater understanding of the use of I-5 within the Mount Vernon/ Burlington urban area. Specifically, the vehicle routing and trip information from the study was intended to assist local and state planners in understanding traffic circulation within the I-5 study corridor. It was assumed that many people are using I-5 instead of nearby arterials for short trips because travel on I-5 offers a significant travel time saving, especially in crossing the Skagit River. To investigate this assumption, the O/D Study examined the route choices of drivers entering and exiting a specific stretch of I-5 from 3 - 6 PM on a Tuesday in early December 1998 to determine the amount of short trips using I-5.

The study corridor for this OD Study included I-5 from the Kincaid Street/Broad Street Interchange (MP 226.39) north to the Cook Rd. Interchange (MP 232.83). This section of I-5 encompasses six interchanges and is approximately 6.6 miles long. I-5 within the study corridor has two-lanes in each direction and full access controlled. Twenty-six advanced video cameras were temporarily installed on the six interchanges' 24 on-and off-ramps. The two (2) other cameras were set to monitor traffic on the parallel Riverside Drive Bridge and collect license plate data. Vehicles passing by these 26

stations were observed for the three-hour period from 3 - 6 PM. Conditions that day were overcast with dry pavement. Over 30,000 vehicle sightings were observed during the three-hour time period.

Travel Patterns of Vehicles Using I-5 Within the Study Area - The OD Study collected data for vehicles entering and exiting I-5 within a six-interchange study area. While increasing daily traffic volumes on I-5 within the corridor is a concern, the primary focus of the OD Study was on the afternoon peak traffic levels. December traffic estimates for I-5 within the study corridor are displayed in Figure 1.

FIGURE 1



The I-5 directional traffic volumes are used extensively in the analysis of the OD Study data. These volumes are estimates of actual traffic levels during the study period since total mainline counts were not available for the study period. SCOG and WSDOT staff worked extensively analyzing recent traffic counts taken within the corridor as well as seasonal adjustment factors to develop this estimate of I-5 directional traffic levels during the study period.

The placement of video cameras at all the on- and off-ramps allowed for the tracking of vehicles that entered and/or exited I-5 on all six interchange including:

1. Vehicles which entered and exited the freeway using one of the six interchanges inside the study corridor as referred to as “inner” study corridor traffic;
2. Vehicles which entered I-5 from outside the study area and exiting using one of the study corridor interchanges, and vehicles which entered I-5 within the study corridor and exited the freeway somewhere else are referred to as “outer” study corridor traffic ; and

3. Vehicles, which passed completely through the study corridor, are referred to as "through" study corridor traffic.

The traffic types were separated to help understand current traffic usage of I-5 within the study corridor. Figure 2 compares the northbound and southbound I-5 traffic volumes by traffic type for the 3-6 PM weekday study period within the corridor. Figure 2 verifies that the northbound "inner" and "through" volumes were consistently greater than southbound throughout the I-5 study corridor during the study period. The northbound "outer" volumes are also greater except at the I-5 Skagit River Bridge crossing where they are almost directionally equal.

FIGURE 2

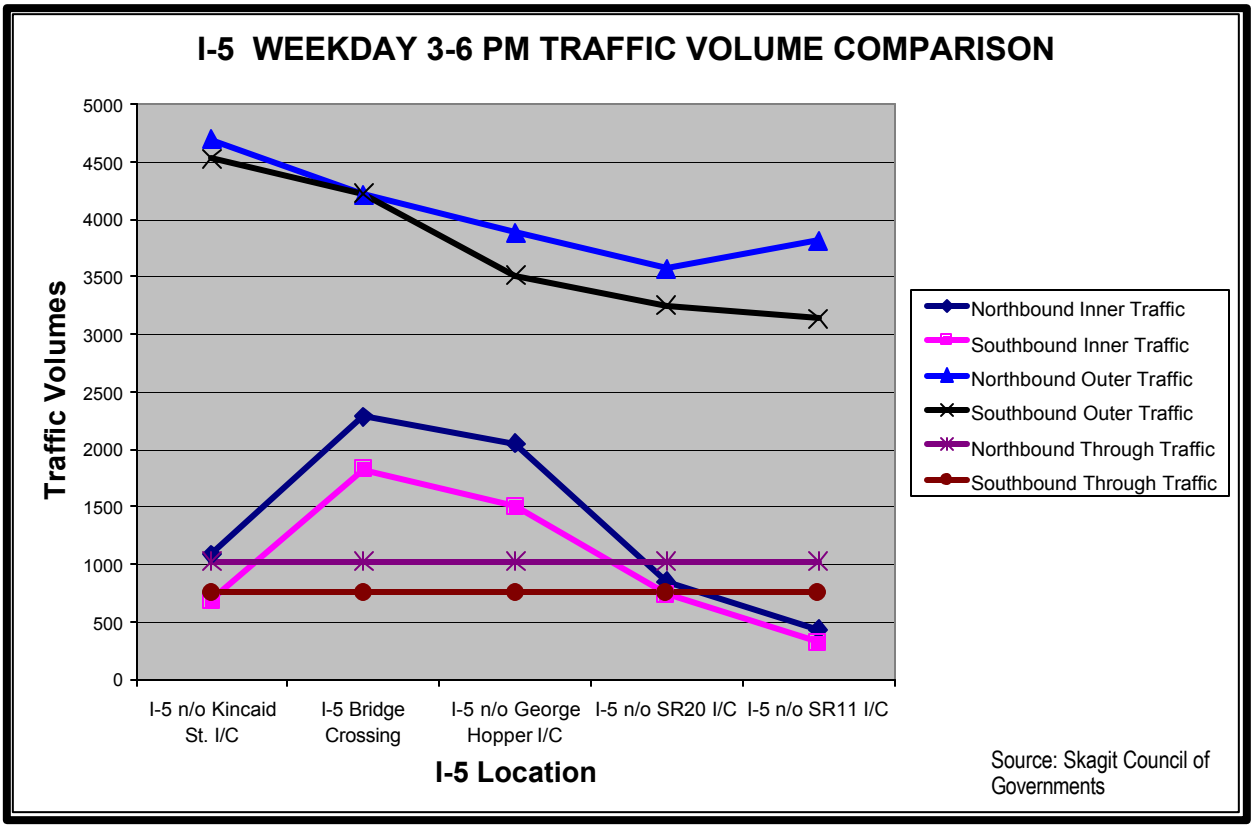
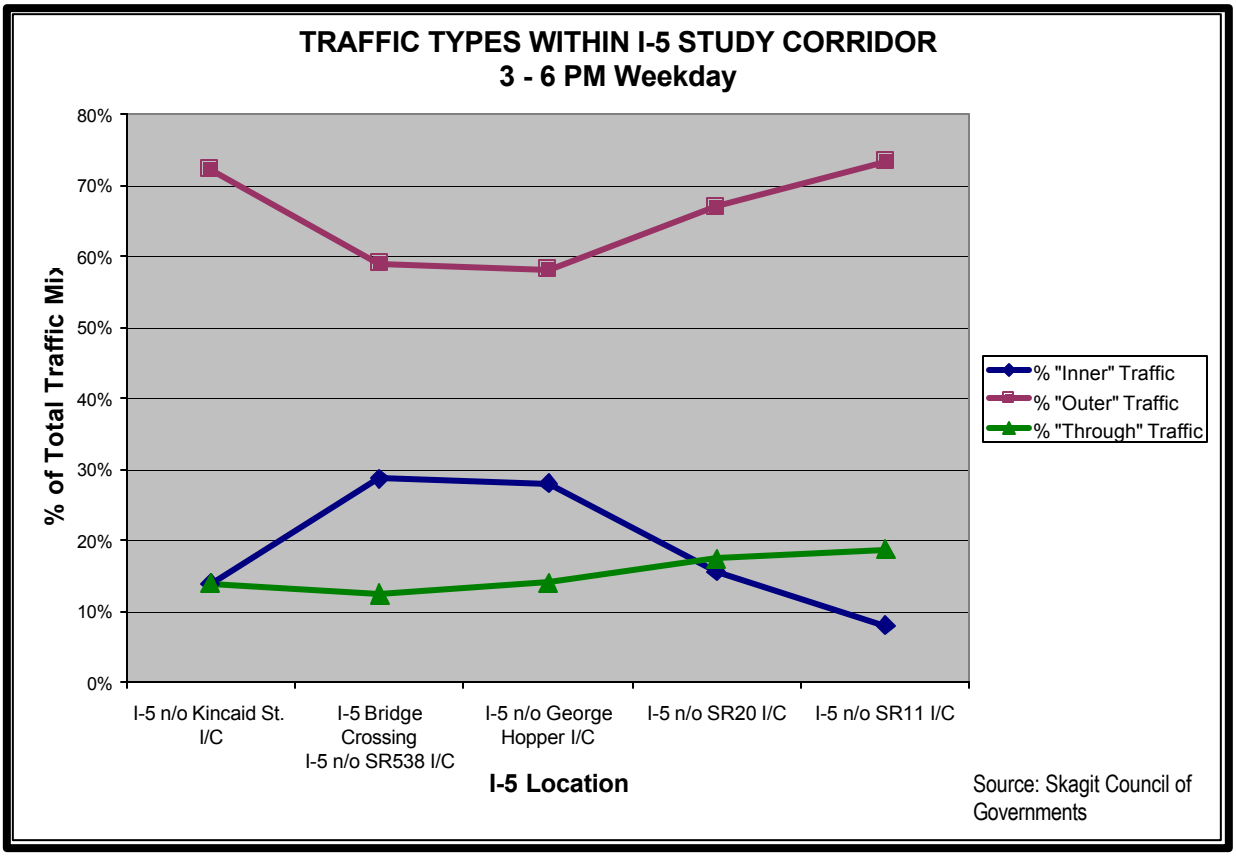


Figure 2 demonstrates a higher northbound volume inside the study corridor during the 3 - 6 PM study period. While this data is based on an initial estimate of I-5 traffic levels during the study period, higher northbound traffic volumes were also consistently observed within the I-5 study corridor for the average weekday 3 - 6 PM period through review of eight different WSDOT traffic counts across a seven-year period. I-5 traffic data south of the corridor also showed consistently higher afternoon northbound traffic volumes. Analysis of I-5 traffic data north of the corridor yielded inconclusive results.

The graph in Figure 3 presents the three traffic types proportionally, as a percentage of the estimated I-5 traffic volumes during the study period. What is interesting to note is that the amount of "inner" corridor traffic increases substantially as a percentage of total traffic and peaks at the I-5 Skagit River Bridge (I-5 n/o SR538). The I-5 Skagit Bridge crossing is the highest traffic volume point on I-5 in Skagit County.

FIGURE 3



Figures 2 and 3 clearly bring into focus the traffic volumes and proportions of the different traffic types observed using the I-5 Skagit River Bridge during the study period. As the Bridge is currently carrying the highest traffic volume and could be most vulnerable to capacity failure, this Bridge becomes a critical link in the overall performance of I-5 within the study corridor and the larger region. In particular, the substantial amount of "inner" study corridor traffic observed on the Bridge may be a strong indication of the impacts of constrained traffic circulation due to limited river crossing choices for the developing Central County.

Expanding our understanding of the three basic types of traffic ("inner", "outer" and "through") observed using the I-5 study corridor are Figures 4 and 5. Figure 4 compares the change in I-5 "inner" and "outer" traffic volumes against the changes in total northbound traffic within the corridor. Figure 5 displays the same comparisons for the southbound I-5 lanes.

On a summary level, the graphs help show how the basic traffic types are utilizing the interchanges within the study corridor. Figure 4 shows that rapid fluctuations of northbound "inner" type traffic were occurring through most of the I-5 study corridor. Focusing on the I-5 Skagit River Bridge, the increase in northbound traffic from just north of the Kincaid St. Interchange to the Skagit River Bridge is due to a dramatic increase of "inner" traffic. This traffic is entering I-5 northbound from the SR 538 Interchange. At the same time, a large amount of northbound "outer" traffic was observed exiting at SR 538. Continuing north along the corridor, the overall northbound I-5 traffic decreases. Much of this decrease is attributed to substantial northbound "inner" traffic observed exiting at the SR 20 and supported by the traffic counts.

FIGURE 4

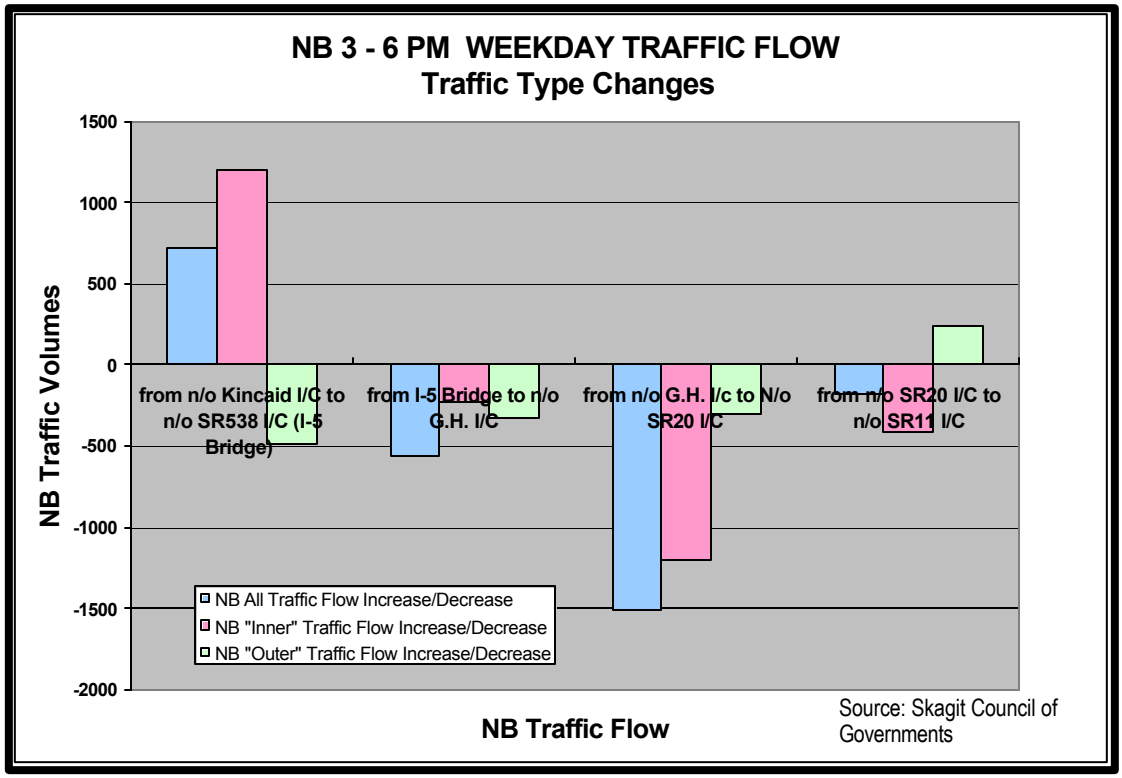
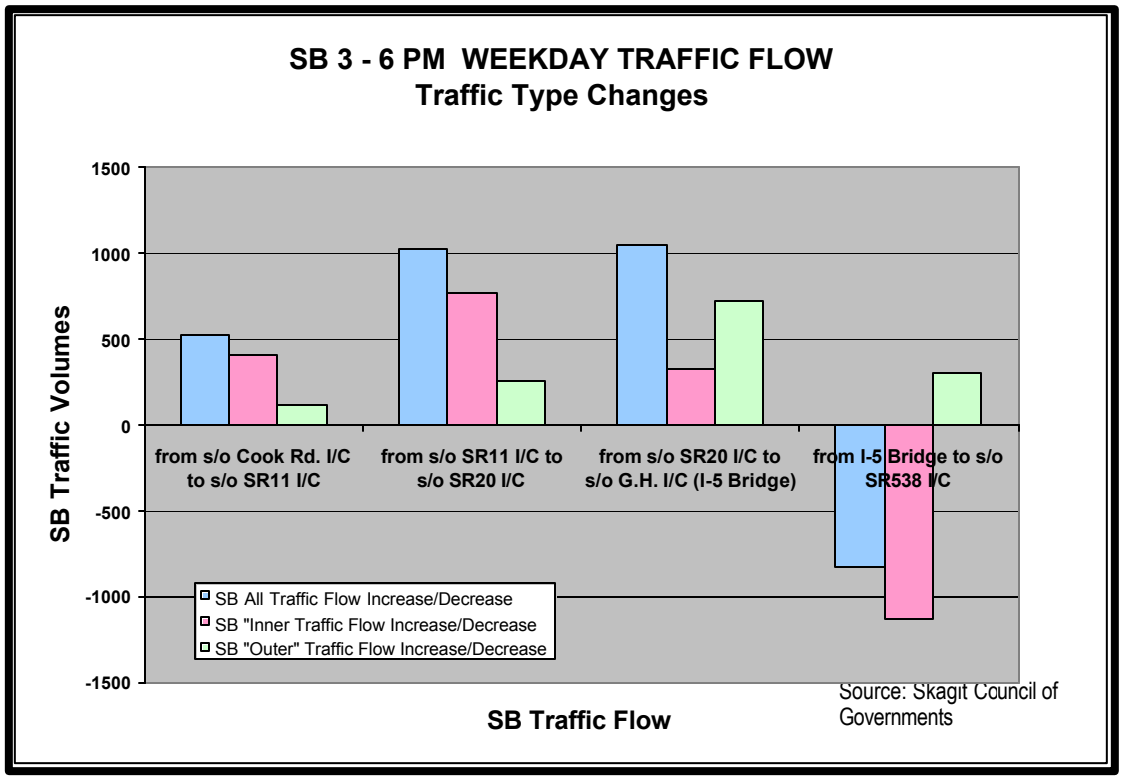


FIGURE 5



In contrast to the northbound traffic, the I-5 corridor southbound traffic type fluctuations seem more gradual as shown in Figure 5. However, the heavy use of the SR 20 and SR 538 interchanges for southbound entering and exiting "inner" traffic is similar. Figure 5 also demonstrates substantial increase in southbound "outer" traffic entering I-5 at the George Hopper and SR 538 interchanges. These observed changes in the basic "inner" and "outer" traffic types are directly related to the patterns of vehicles getting on and off I-5 at the interchanges.

Travel Survey - A travel survey was mailed to 10,000 vehicle owners who were observed entering and/or exiting I-5 within the study corridor. The survey collected additional trip information and provided feedback on a number of other transportation-related questions. Surveys were also sent to vehicle owners of vehicles observed traveling across the Riverside Drive Bridge, a key link in the nearby parallel north/south facility directly east of I-5. Approximately 3,400 people returned the survey.

From this survey, secondary study goals were achieved that included the collection of trip origins and destinations, trip purpose, perceptions of existing congestion within the corridor, reported carpooling, reported transit use, and desired transit improvements. Other basic demographic data was also collected including age, number of household vehicles, etc. The mail-back survey provided information that will help answer key questions about travel within the study corridor and the larger urbanized area. This information included:

1. How much of the December 1998 weekday afternoon traffic on I-5 within the study corridor was trips confined within the Central Skagit County urbanized area?
2. How many of the trips were longer regional and statewide trips?
3. What kind of trips were people making (work to home or shopping, etc.)?
4. What was the average frequency of these trips for an individual during a typical 3-6 PM weekday? and
5. What was the individual's current transit and carpool use during a typical 3-6 PM weekday?

When taken together, the mail back survey results and the vehicle routing data provided an insight to the travel pattern for the typical survey respondent. This information will help local and state transportation professionals develop and test transportation solutions that better fit the needs of these travelers including highway corridor studies, local jurisdiction traffic model development, arterial system development, non-motorized system planning, and transit planning.

Preliminary Findings - The following are some of the preliminary findings documented from this OD Study.

- Traffic patterns on I-5 within the study corridor exhibit patterns that indicate that I-5 is being used as an alternative route for short trips within Central Skagit County. These short trips represent nearly 30 percent of all trips on I-5 during the afternoon peak period at over the Skagit River Bridge.
- A significant quantity of these short "inner" trips on I-5 is observed throughout the corridor and has its highest concentration at the I-5 Skagit River Bridge crossing. Most of this traffic is traveling two miles or less on I-5, is crossing the Skagit River, and is exiting after traveling past only one or two interchanges.

- It is apparent that I-5 "through" study corridor traffic is not a significant factor in any current congestion on I-5.
- This study supports the understanding that traffic within Central Skagit County is shifting to the less congested and faster moving I-5. This trend is expected to continue until travel times are roughly equal for all the bridge corridors across the entire county and beyond.
- As part of arterial development planning, a more comprehensive and combined examination of exiting and future planned land use development within the Central County is needed as it is creating the demand for transportation in the first place.

More detailed information and analyses are contained in the following draft documents:

- *Draft Final Report: Skagit County I-5/Riverside Dr. Origin/Destination Study*, prepared for Skagit County Association of Governments by ATD Northwest, June 30, 1999; and
- *Draft Executive Report for the Skagit I-5 Origin Destination Study Report,* prepared by the Skagit Council of Governments, September 23, 1999.

FUTURE I-5 TRAFFIC CONDITIONS

By 2020, the traffic volumes on I-5 are expected to significantly increase. The forecasted 2020 traffic was developed by WSDOT with support from the Skagit Council of Governments. The Skagit Council of Governments provided WSDOT with their travel demand input files, highway network and origin/destination (OD) data for 1993 and 2013. The travel demand model was originally developed in 1993 for the development of the *Skagit County Subarea Transportation Plan*, which was adopted in 1996. Skagit Council of Governments provided parameters for the model.

The highway network reflected the future transportation system in Skagit County based on the financially feasible, long range transportation plans for Skagit County adopted in 1996 as well as the transportation plans for the various cities including Mount Vernon, Burlington and Sedro Woolley and Skagit County rural areas. The future transportation system includes a new Riverside Bridge over the Skagit River, an extension to LaVenture Road to Anderson Road in Mount Vernon and other highway improvements throughout the county. All improvements are expected to be implemented by 2020.

OD vehicle trip tables were also available showing expected trip activity between traffic analysis zones (TAZs) for the base year 1993 and a future 2013 base on anticipated land use data. To develop year 2020 projections for this study, a linear extrapolation method was directly applied to the OD vehicle trip tables and external-external vehicle trip data, instead of dealing with base land use information. The 2020 OD and external-external vehicle trips were extrapolated from the 1993 and 2013 OD data.

The Skagit Council of Governments' 2013 highway network was then used to assign the 2020 OD trips and external trips. This assignment represents the future year No-Build Alternative. The results of the travel demand model assignment included forecasted 2020 afternoon, peak hour traffic. These assignment results as well as the LOS analysis, using the 1997 Highway Capacity Software based on the Transportation Research Board Special Report 209, are summarized in Table 2.

As can be seen from a comparison of the WSDOT Service Objectives of "D" for urban areas and "C" for rural areas with the future traffic conditions, I-5 will have a serious capacity deficiency if no additional I-5 capacity or local roadway infrastructure improvements are in-place by 2020.

TABLE 2
I-5 2020 AFTERNOON PEAK HOUR TRAFFIC VOLUMES AND LEVEL OF SERVICE NO-BUILD CONDITIONS

	2020 I-5 FUTURE NO-BUILD CONDITIONS 4-LANE ROADWAY											
	Southbound						Northbound					
Cross Streets	Peak Hour Volume (vehicles)	Service Flow Rate (pc/hr/ln)	Adjusted Free-Flow Speed (mph)	Average Pass. Car Speed (mph)	Density (pc/mi/ln)	LOS	Peak Hour Volume (vehicles)	Service Flow Rate (pc/hr/ln)	Adjusted Free-Flow Speed (mph)	Average Pass. Car Speed (mph)	Density (pc/mi/ln)	LOS
Cook Rd.	2,781	1,756	65.5	64.2	27.3	D	3,088	1,919	64.2	61.9	31.0	D
SR 11	3,098	1,955	65.5	62.7	31.2	D	3,487	2,167	64.0	57.4	37.7	E
SR 20	3,864	2,438	65.2	48.0	50.8	F	4,147	2,576	64.4	39.2	65.7	F
G. Hopper Rd.	4,439	2,804	65.1	16.6	169.4	F	4,488	2,788	64.6	19.5	142.8	F
College Way	4,062	2,562	64.0	40.5	63.3	F	4,014	2,493	64.8	44.6	55.9	F
Kincaid St.	3,864	2,437	64.3	47.7	51.1	F	3,547	2,203	65.4	57.8	38.1	E
Anderson Rd.	3,242	2,045	64.6	60.6	33.7	E	3,015	1,871	65.5	63.5	29.5	D
Hickox Rd.												

Source: WSDOT and H. W. Lochner, Inc.

LOCAL ARTERIAL TRAFFIC CONDITIONS

This study is also to assess the impact of the various build alternatives on local arterials. To accomplish this objective, baseline local conditions were established for selected arterial identified by WSDOT and the Cities of Mount Vernon and Burlington. Available local traffic counts were collected and future 2020 traffic volumes were projected. These traffic volumes were analyzed and LOS ratings were developed, as displayed on Table 3. The values in this table represent the highest traffic and/or worst level of service along the various arterial segments for the existing and projected 2020 No Build baseline conditions for comparison purposes.

From a review of this table, traffic levels are expected to increase significantly on some roadway sections by 2020. The traffic increases will result in increased congestion by 2020 on SR 20, SR 536, SR 538, SR 9 and Cook Road as well as sections of Burlington Boulevard, Riverside Drive and Division Street, if no additional improvements are implemented.

EXISTING ENVIRONMENTAL BASELINE

The purpose of this work is to provide a sketch planning level environmental analysis of the alternatives being considered for mobility improvements in the I-5 corridor between Anderson Road and Cook Road in Skagit County. This study includes planning level inventories of land uses, areas of flooding, wetland and terrestrial habitat, fisheries, geological characteristics, and environmental justice issues. Local agencies, WSDOT and concerned citizens have identified these issues as important to an initial assessment of the relative feasibility of the different alternatives.

TABLE 3
SUMMARY OF KEY ARTERIAL TRAFFIC VOLUMES AND LEVEL OF SERVICE DURING AN AVERAGE WEEKDAY PM PEAK HOUR IN 2020 EXISTING AND 2020 NO BUILD CONDITIONS

No.	Name of Roadway/Arterial	Existing (1998 - 1999)		No Build (2020)	
		Critical Vol.	LOS	Critical Vol.	LOS
1	SR 11 (Burlington Blvd. To Josh Wilson Rd.)	600	B	746	C
2	SR 20 (SR 536 through the Gardner Rd.)				
	2a. from SR 536 to Avon Allen Rd.	*****	*****	1734	E
	2b. from Avon Allen Rd. to I-5	*****	*****	1825	F
	2c. from I-5 to Avon Ave.	507	C	1757	E
	2d. from Avon Ave. to Gardner Rd.	*****	*****	1311	E
	2e. from Gardner Rd. to Collins Rd.	*****	*****	1762	F
	2f. from Collins Rd. to SR 9	*****	*****	1438	F
3	SR 536 (I-5 to SR 20)				
	3a. from I-5 to Skagit River	*****	*****	1187	F
	3b. from Skagit River to Avon Allen Rd.	*****	*****	1683	F
	3c. from Avon Allen Rd. to SR 20	*****	*****	1525	F
4	SR 538 (Freeway Dr. to Laventure Rd.)				
	4a. from Freeway Dr. to Riverside Dr.	1112	D	1770	F
	4b. from Riverside Dr. to Laventure Rd.	1092	C	1811	E/F
5	George Hopper Rd. (Riverside Dr. To Bouslog Rd.)	728	B/C	1152	D
6	Burlington Blvd. (Skagit River to SR 20)				
	6a. from Skagit River to Pease Rd.	1136	C	2441	F
	6b. from Pease Rd. to SR 20	968	C	1467	D
	6c. from SR 20 to Avon Rd.	*****	*****	1329	E
	6b. from Avon Rd. to Cook Rd.	*****	*****	582	B
7	Riverside Dr./Mt. Vernon Rd. (Hickox Rd. to Skagit River)				
	7a. from Hickox Rd. to Blackburn Rd.	304	A	556	B
	7b. from Blackburn Rd. to Kincaid St.	*****	*****	914	F
	7c. from Kincaid St. to Fulton St.	*****	*****	1315	F
	7d. from Fulton St. to Skagit River	1683	D	1869	E/F
8	Freeway Dr. (SR 536 to SR 538)	620	C	650	C
9	Anderson Rd. (Cedardale Rd. to Mt. Vernon Rd.)	183	A	934	C
10	Cedardale Rd. (Stackpole Rd. to Blackburn Rd.)				
	10a. from Stackpole Rd. to Hickox Rd.	*****	*****	229	A
	10b. from Hickox Rd. to Blackburn Rd.	216	A	779	C
11	Laventure Rd. (Hoag Rd. to Section St.)				
	11a. from Hoag Rd. to Fir St.	502	C	601	D
	11b. from Fir St. to Section St.	394	B	756	C

TABLE 3 Continued
SUMMARY OF KEY ARTERIAL TRAFFIC VOLUMES AND LEVEL OF SERVICE
DURING AN AVERAGE WEEKDAY PM PEAK HOUR IN 2020
EXISTING AND NO BUILD CONDITIONS

No.	Name of Roadway/Arterial	Existing (1998 - 1999)		No Build (2020)	
		Critical Vol.	LOS	Critical Vol.	LOS
12	Division Street (6th Street to SR 9)				
	12a. from 6th St. to LaVenture Rd.	*****	*****	738	C
	12b. from LaVenture Rd. to Waugh Rd.	*****	*****	528	B
	12c. from Waugh Rd. to SR 9	*****	*****	1027	F
13	Kincaid Street/Broad Street (I-5 to 15th St.)	*****	*****	1052	C
14	Blackburn Rd. (Little Mountain Rd. to Mt. Vernon Rd.)	*****	*****	1078	D
15	Cook Rd. (I-5 to SR 9)				
	15a. from I-5 to Gardner Rd.	*****	*****	1083	E
	15b. from Gardner Rd. to Collins Rd.	*****	*****	1319	F
	15c. from Collins Rd. to SR 9.	*****	*****	1062	E
16	SR 9 (Division St. to SR 20)				
	16a. from Division St to Gunderson Rd.	*****	*****	1018	E
	16b. from Gunderson Rd. to Mud Lake Rd.	*****	*****	766	E
	16c. from Mud Lake Rd. to South Skagit Hwy.	*****	*****	864	E

Note: ***** No count data was available Source: WSDOT and H. W. Lochner, Inc.

The following discussions present an environmental baseline for analysis purposes in this pre-design study. Each issue is described in general detail to establish the context within which professional judgement will be employed to assess environmental risk or potential impact.

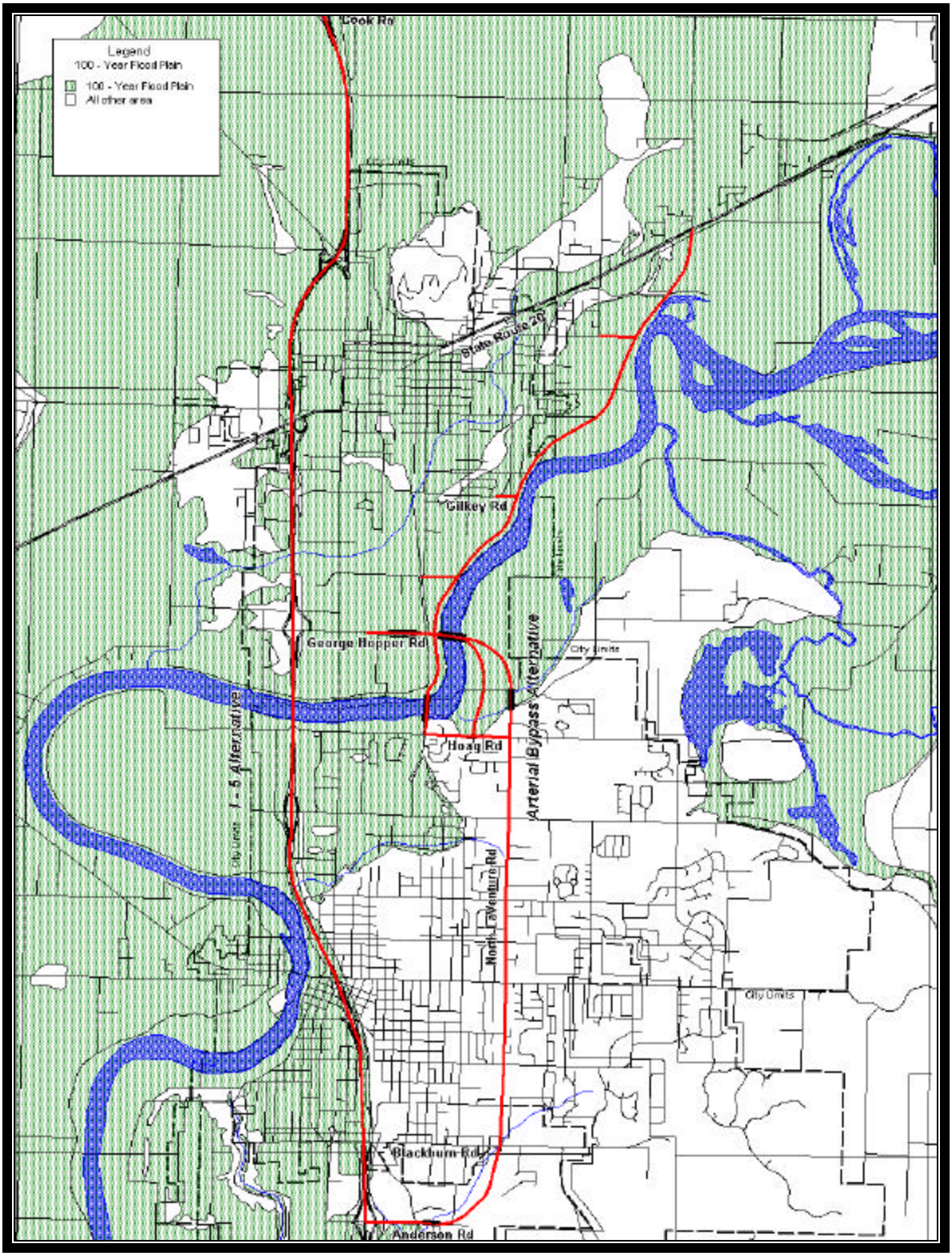
Floodplains, River or Stream Crossings/Fishery Resources

The Skagit River and some of its tributary streams run through the study area. The entire I-5 corridor and the portions of the Arterial By-Pass route, particularly north of the Skagit River, all lie within the 100-year floodplain. These features are illustrated in Exhibit 2.

The Skagit River is utilized by virtually all salmonoid species that inhabit the Puget Sound basin area. This river serves as a transportation route for adult spawners and provides the rearing environment for juvenile anadromous species during their out-migration to the sea. In addition to providing large numbers of all Pacific salmon species to the tribal fisheries for subsistence, ceremonial and commercial purposes, the study area sustains an excellent sport fishery for Chinook, Coho, and pink salmon. In recent years, several species of salmon have been in decline. The principal limiting factor to fisheries within the study reach is the amount of available rearing area, which is directly related to shore cover.

The portion of the river within the study area is critically important to all five species of Pacific salmon as well as steelhead and sea-run cutthroat. The Skagit River supports the largest natural Chinook run in Puget Sound (six separate stocks have been identified) and, along with other nearby rivers, is managed for escapement of wild stocks. Coho salmon use almost all of the accessible tributaries in the Skagit Basin. There are three separate stocks of Chum salmon that use this portion of the river.

EXHIBIT 2
100 YEAR FLOOD PLAIN



Source: FEMA and Dames & Moore

The Skagit River also supports the largest run of pink salmon in Washington State. Sockeye salmon and steelhead trout (both summer- and winter-run) migrate seasonally through the study area. A sizable subgroup of the Puget Sound region's population of bull trout inhabits the Skagit River as well.

Currently, the Chinook salmon is listed as "threatened" under Section 7 of the Endangered Species Act. Bull trout, Coho, and sea-run cutthroat are "candidate" species and may be listed sometime in the near future. Any proposed development in, near, or anywhere within the immediate watershed of the Skagit River and its tributaries, which support these species, would require a review by both National Marine Fisheries Service and the U.S. Fish and Wildlife Service, through a consultation procedure, during the environmental review process.

Land Use

Land uses in the areas potentially affected by the project range from residential to commercial, and agricultural to light industrial. For this environmental evaluation, it is useful to survey the extent of each type of land use encountered along each route. In addition, it is necessary to develop an approximate idea of the number of properties likely to be altered or eliminated for the different alternatives. A listing of the approximate percentage of land use types encountered along the routes being considered should be identified for each alternative.

Historical or Cultural Resources

A survey of County records revealed no historical or culturally significant sites or resources either along the I-5 right-of-way itself or directly in the alternative routes (or its subroutes) to the east of the freeway. Inquiries to the State Historic Preservation Office similarly revealed no identified sites along these routes. Inquiries with the Skagit County Historic Society revealed separate white settler and Native American settlements within the agricultural lands surrounding the Skagit River. These are sites that have been identified through past archaeological and historical research efforts. The locations of these sites are shown in Exhibit 3.

Environmental Justice

All WSDOT projects must comply with Executive Order 12898, Environmental Justice, and the U.S. Department of Transportation (DOT) Order on Environmental Justice. The purpose of this requirement is to determine whether high and adverse human health or environmental effects of a proposed project are likely to fall disproportionately on low-income or minority populations.

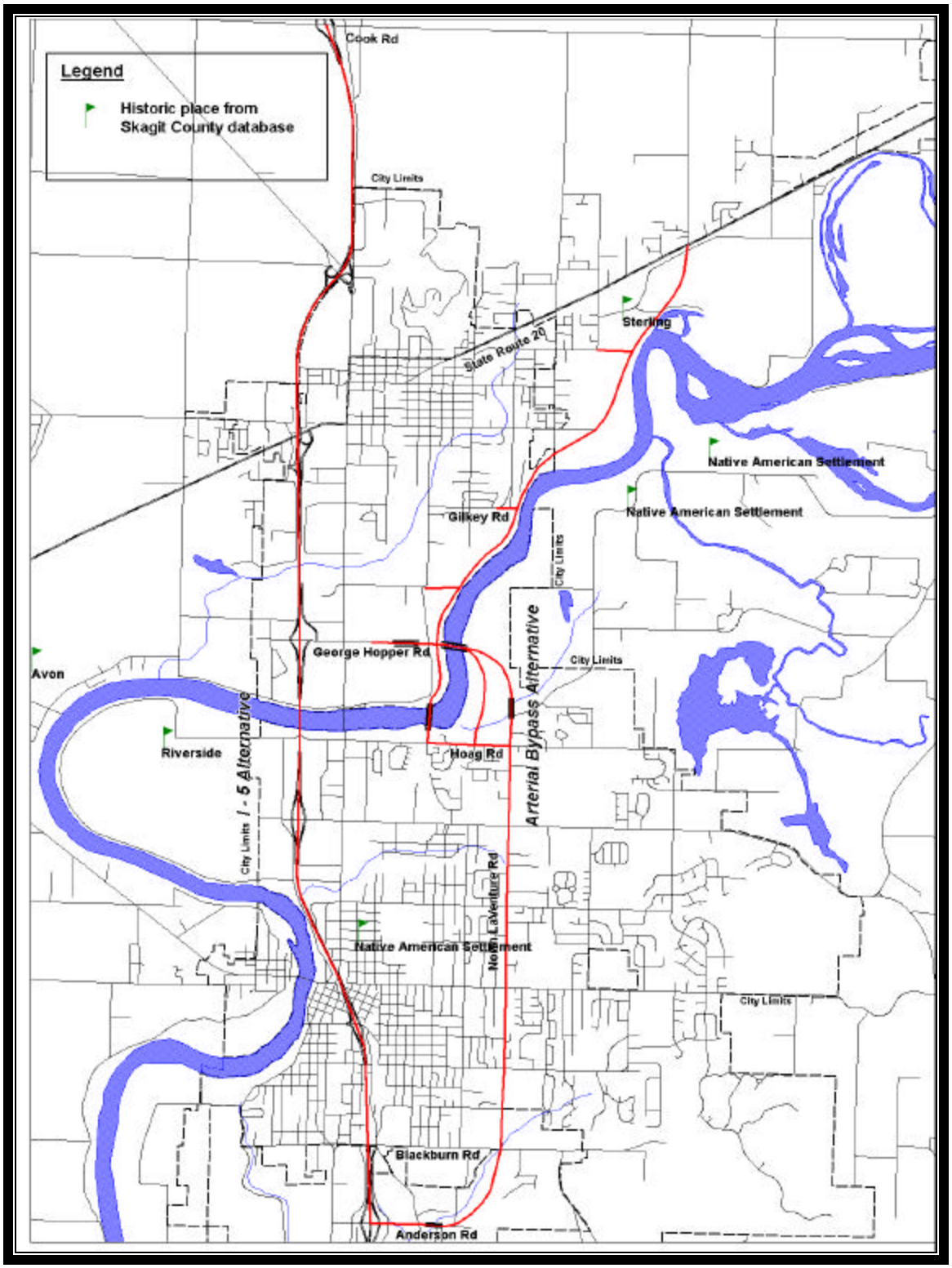
WSDOT defines *Low-Income* as follows: "Low-Income means a person whose median household income is at or below the Department of Health and Human Services poverty guideline." There is no source of readily available data describing how many families in a project area fall below this poverty level. This information would have to be collected through a survey of family incomes by family size in the study area. A *Low-Income Population* is defined as "any readily identifiable group of low-income persons who live in geographic proximity, and, if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who will be similarly affected by a proposed WSDOT program, policy, or activity".

WSDOT defines *Minority* as follows: "Minority means a person who is:

(1) Black (a person having origins in any of the black racial groups of Africa);

(2) Hispanic (a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race);

EXHIBIT 3
HISTORICAL FEATURES



Source: Dames and Moore

(3) Asian American (a person having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands); or

(4) American Indian and Alaskan Native (a person having origins in any of the original people of North America and who maintains cultural identification through tribal affiliation or community recognition)."

For the purpose of this and future environmental documentation, low-income and minority populations are to be assessed using these definitions.

Wetlands/Wildlife

A field reconnaissance level survey was conducted of both the I-5 corridor where widening may occur and along the arterial bypass route associated with the project. This field survey supplemented available GIS wetland inventory and wildlife habitat data and assisted in locating wetland areas near proposed routes and identifying wildlife species that are present. Recent field observations revealed small wetlands throughout the area and along or adjacent to each of the proposed routes, as shown on Exhibit 4. To determine total wetland impacts associated with the project, wetland delineations are needed along each of the proposed routes.

Wildlife species observed during the field reconnaissance include the House Sparrow (*Passer domesticus*), House Finch (*Carpodacus mexicanus*), Rock Dove (*Columba livia*), Barn Swallow (*Hirundo rustica*), Cliff Swallow (*Hirundo pyrrhonota*), Bald Eagle (*Haliaeetus leucocephalus*), and Red-tailed Hawk (*Buteo jamaicensis*). Information on any endangered, threatened, or species of special concern in or near the study area from state or federal agencies has not been obtained at this time. This information is helpful to determine if any wildlife species of concern occur within the area.

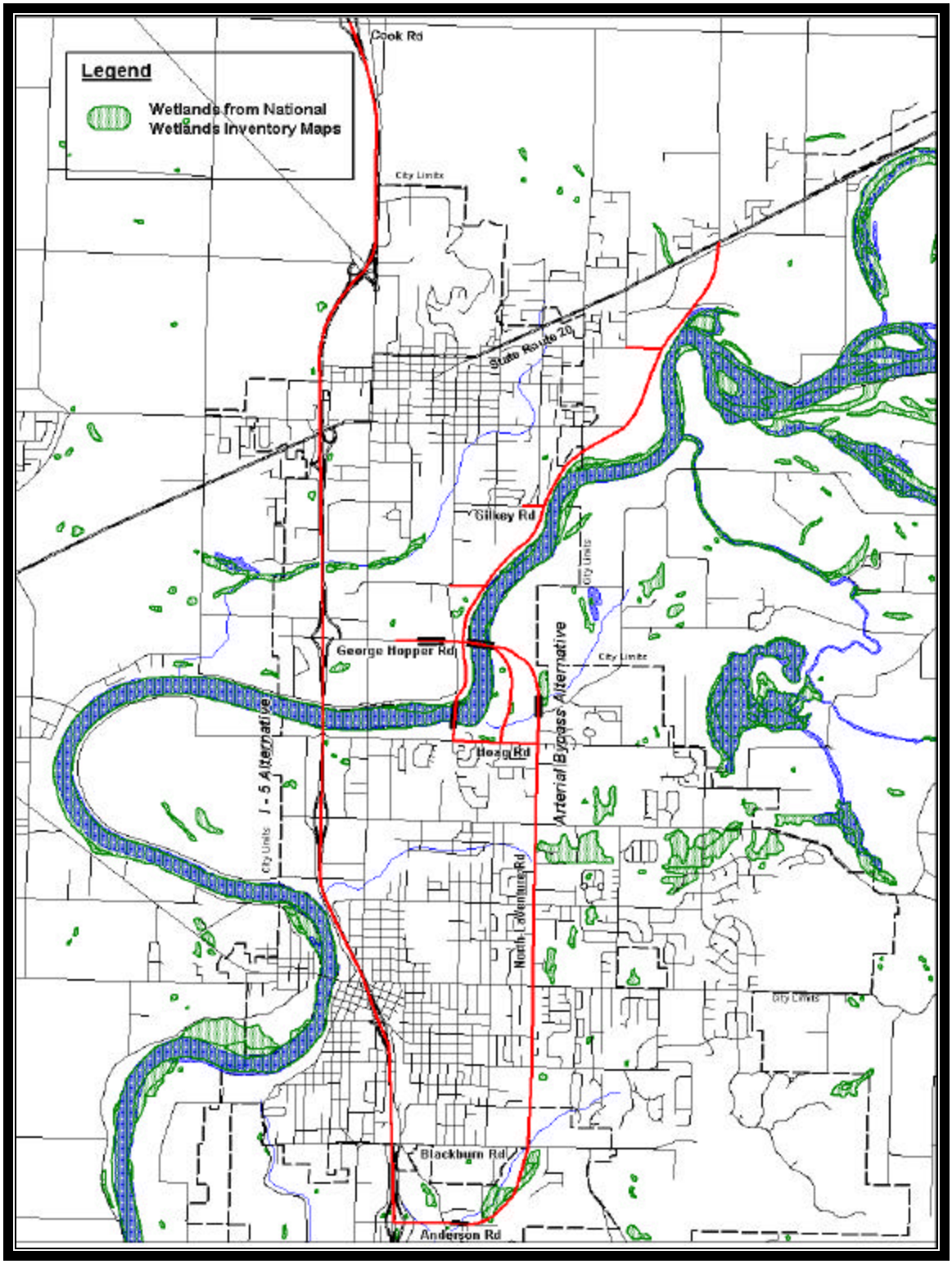
Species of concern for the study area are listed below by category:

- Plants – Information was obtained from the Washington Natural Heritage Program regarding priority plant habitats and species within the project vicinity. The bristly sedge (*Carex comosa*) (State Sensitive) and the soft-leaf willow (*Salix sessilifolia*) (State Threatened) both occur in or near the study area. Project construction will likely involve some mitigative measures with regards to potential disturbance of these two species.
- Wildlife – Information was obtained from the Washington Department of Fish and Wildlife (WDFW) regarding priority habitats and species within the project vicinity, as shown on Exhibit 4A. Based on map data provided by the WDFW, Bald Eagle (State and Federal Threatened), Osprey (*Pandion haliaetus*), and Great Blue Heron (*Ardea herodias*) nests are located within the project vicinity. In addition, priority Bald Eagle and Trumpeter Swan (*Cygnus buccinator*) habitat exists within the project vicinity, as shown on Exhibit 4B. Project construction will likely involve some mitigative measures with regards to potential disturbance of wildlife habitats and species.

Geotechnical/Physical

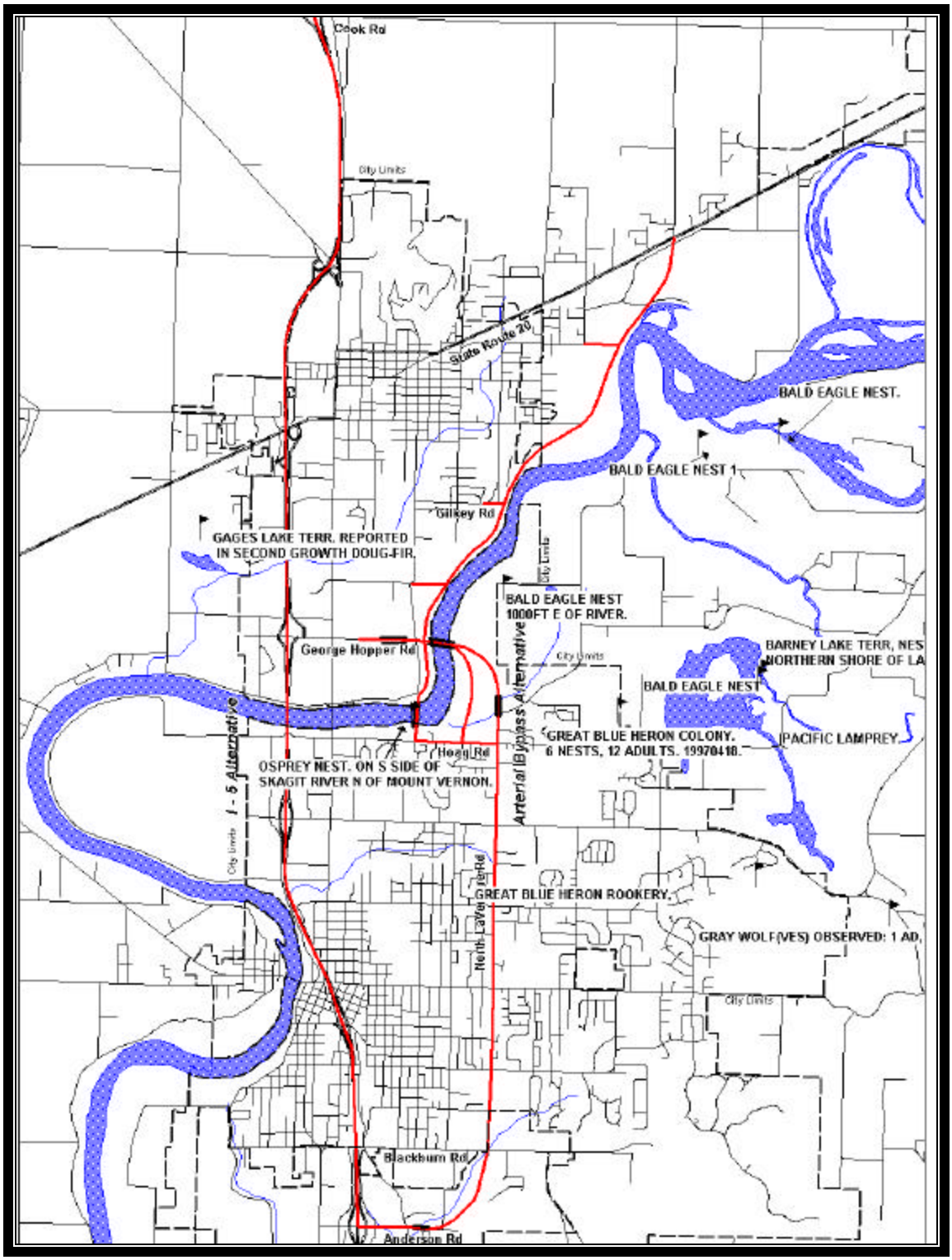
Soil conditions along the alignments under consideration are described in Dethier and Whetten (1981, Preliminary Geologic Map of the Mount Vernon Quadrangle, Skagit County, Washington; U.S. Geologic Survey Open File Report 81-105). Much of the south half of the area under consideration is occupied by reasonably competent terrace deposits on gently sloping topography, and are underlain by very competent glacial soils or bedrock. The northern half and the western edge of I-5 in the southern half are occupied by recent flood plain alluvium.

EXHIBIT 4
WETLANDS AREAS



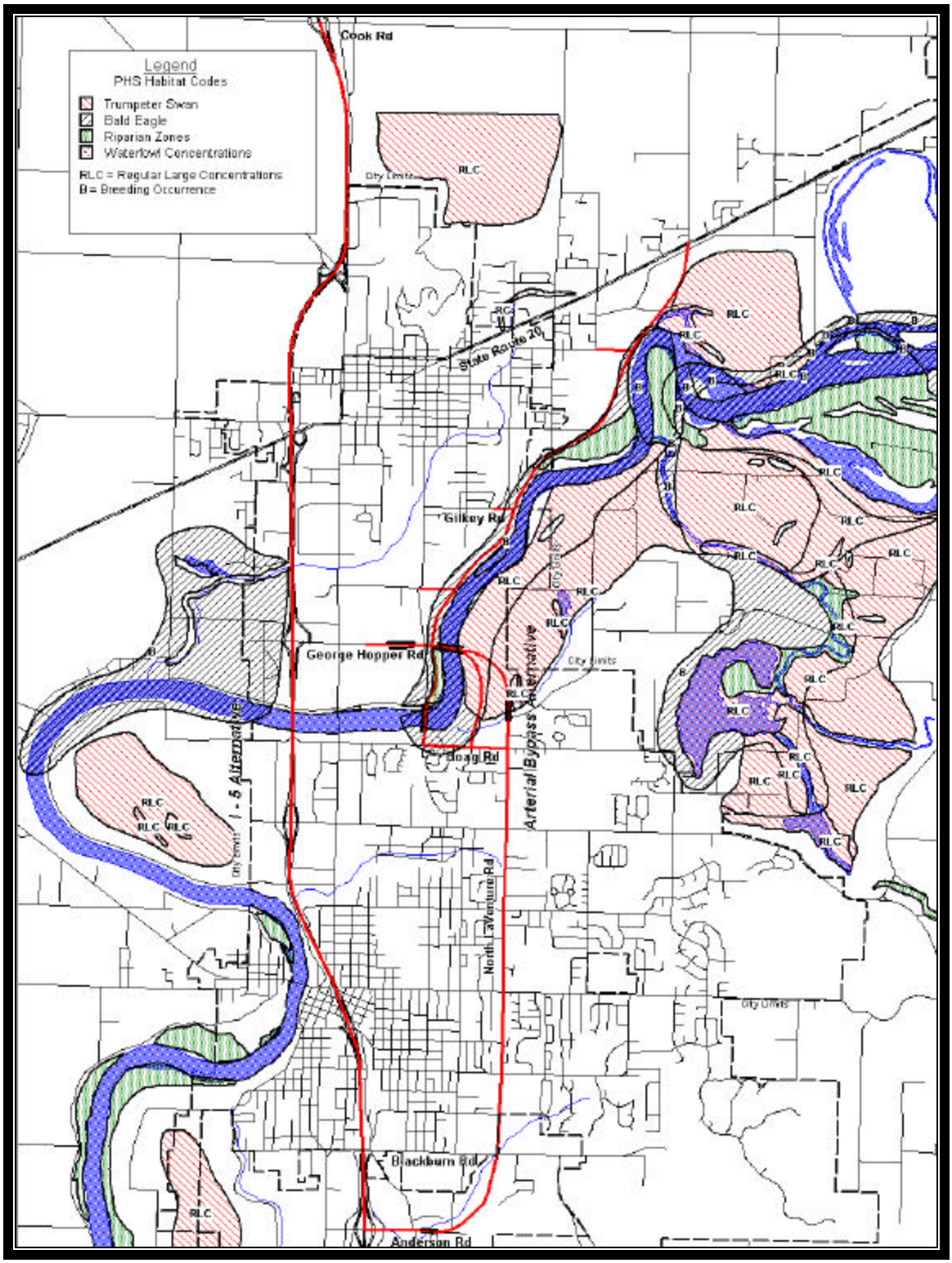
Source: National Wetland Inventory Maps and Dames & Moore

EXHIBIT 4A
WILDLIFE AREAS



Source: Dames & Moore

EXHIBIT 4B
HABITAT AREAS



Source: Dames & Moore

I-5 CORRIDOR ALTERNATIVES

An initial public workshop was held on November 10, 1998 to identify possible alternative solutions that should be evaluated. Alternatives that were discussed included freeway widening, improved transit service, travel demand management strategies, freeway by-pass, arterial by-pass, double decking and do-nothing. In addition, several agency meetings were held between October and December 1998 to identify other possible alternatives and determine those alternatives that merit analysis.

On December 9, 1998, the study Steering Committee, which is comprised of representatives from Skagit County, Mount Vernon, Burlington, Sedro Woolley, Skagit Council of Governments, Skagit Transit and WSDOT, recommended three I-5 corridor alternatives for detailed analysis. These alternatives were:

- **A Transportation System Management (TSM) and Transportation Demand Management (TDM) Alternative**. This alternative includes a variety of low capital cost improvements and strategies. This alternative includes an increase in Intercity rail passenger service, an expansion of transit service and non-motorized transportation services, and an increase in park-and-ride capacity, as well as safety and other selected, low cost, transportation system improvements to comply with current design standards in the Burlington/Mount Vernon urban area.
- **An Arterial By-Pass Alternative**. This by-pass alternative would generally use parallel arterial improvements on existing and/or future arterials with a new bridge over the Skagit River in addition to the planned Riverside Bridge expansion.
- **I-5 Widening Alternatives**. This alternative widens I-5 from a four-lane facility to a six-lane facility with or without possible space for future HOV lanes or additional general purpose lanes.

All of these alternatives assume that the adopted, financially feasible transportation plans for the cities of Mount Vernon and Burlington, Skagit County and WSDOT will be in place by 2020. This includes a new four-lane Riverside Drive/Burlington Boulevard bridge over the Skagit River.

Detailed descriptions of these alternatives are presented in the following sections. For this sketch planning analysis exhibits were developed to illustrate the various cross-sections associated with these alternatives in critical locations. Detailed plans of the entire corridor were not developed for this pre-design study.

I-5 TSM/TDM ALTERNATIVE

This transportation system management (TSM) and transportation demand management (TDM) alternative includes strategies to reduce congestion by encouraging ridesharing, transit and non-motorized solutions, as well as improvements to safety and low cost design improvements to meet current design standards. With the passage of Initiative 695, funding for many of the traditional programs will be eliminated or reduced. However, for this alternative, it is assumed that some funding mechanisms will be in place by 2020 to allow these programs and strategies to continue and expand.

TSM Improvements

TSM improvements are projects that can be undertaken to improve the safety and efficiency of the existing transportation facility by using short-term, low-capital improvements to existing facilities. These improvements generally cost less and can be implemented faster than major capacity

improvements. TSM improvements have been a recognized method to reduce congestion and improve air quality in urban and suburban areas for many years. The TSM improvements for the I-5 study area include safety up-grades and low-cost design standard improvements, as discussed below. All improvements are assumed to be constructible in existing I-5 right-of-way and no property acquisition is included in this alternative for these TSM improvements.

I-5 Safety Upgrade - Guardrail for the embankment areas are not generally warranted except at bridge ends, since the clear zone generally appears to be free of obstructions. However, a clear zone inventory of all obstructions has not been completed for this study and some additional improvements may be required.

There is median double beam guardrail in a segment of I-5 from the I-5/George Hopper Road interchange to the I-5/SR 11 interchange. Median double beam guardrails could be added to the remaining open area segments to reduce the incidence of errant vehicles crossing the median.

Some of the bridge barriers were constructed to older standards and may not meet current crash restraint requirements. More detailed design and safety analyses are required to determine if they have adequate strength and shape to meet current requirements.

Compliance with Current Geometric Design Standards - The I-5 freeway is part of the interstate system and therefore full interstate standards apply in determining compliance. The current geometric design standards for the interstate system are shown on Figure 440-3 in WSDOT's Design Manual. Conditions in the study area are mostly urban with transitions to rural at each end. The terrain is mostly level to rolling through the study area. The existing posted speed limits through the study area ranges from 60 mph to 70 mph. As a result, the various roadway sections were analyzed to determine if the current design requirements for speeds of 60 mph and 70 mph can be maintained.

The I-5 sections in the study area were analyzed to determine if minimum stopping sight distances with existing speed limits are met. The findings from these analyses and proposed solutions for discrepancies are briefly summarized below:

- For a 60 mph design speed:
  - ⇒ All main line horizontal curves within the study limits meet the current design requirements for their respective superelevation rates.
  - ⇒ A preliminary analysis of the vertical profile was performed using a simple set of sight distance formulas and available as-built construction plans. Based on the formulas for sight distance shown in Figure 650-3 in the Design Manual, there appear to be several locations where the calculated stopping sight distance does not meet the standard for a 60-mph design speed. These sections are discussed below.
    - Minor problems were identified at the sag vertical curve at the beginning of ascent and the ending of descent for the over-crossings at College Way. This area is within a well-lighted interchange. Under well-lighted conditions, the calculations for sag sight distance do not apply. For unlighted conditions, however, the profiles in these sag curves appear correctable to meet stopping sight distance requirements by minor profile adjustments. This could be made by varying depth of any future overlay to lengthen the vertical curve length. This improvement was included as part of this alternative.

- Minor problems were also identified at the crest curves at the north end of the over-crossing at Cameron Way and its northern approach for the southbound lanes. These problems also appear to be correctable for unlighted conditions by minor profile adjustments that would lengthen the vertical curve length by a varying depth of any future overlay. Further study including field survey of the actual profile is needed to determine the exact extent of these problem areas. This improvement was included as part of this alternative.
- A more difficult problem appears to exist along the southbound and northbound roadways approaching Kincaid Street from the south. The stopping sight distance for the crest curve over the over-crossing does not meet the criteria for a 60-mph design speed. The alternatives to correct this problem will require reconstruction of approximately ¼ mile of roadway and raising the grade approximately 2.5 feet in places. The southbound on-ramp and its retaining walls will also require reconstruction. The constructibility issues and the difficulty of avoiding interruption of traffic require serious consideration. Any plan to alleviate these sight distance deficiencies is best planned as part of one of the widening alternatives. This improvement was not included as part of this alternative.

♦ For a 70 mph design speed:

⇒ All main line horizontal curves within the study limits meet the current design requirements for their respective superelevation rates.

⇒ A preliminary analysis of the vertical profile was also performed using a simple set of sight distance formulas and available as-built construction plans and using a 70-mph design speed. In addition to those locations where the calculated stopping sight distance does not meet the standard for a 60-mph design speed, there are two more locations where a 70-mph design speed standard is not met. These locations are in the vicinity of the Skagit River Bridge and at the SR 20 over-crossing. These problems are considered minor and can be adjusted during pavement overlays. These improvements were included in this alternative.

♦ A preliminary analysis of shoulder widths was made to determine where deficiencies exist. Only the Skagit River Crossing has sub-standard outside shoulders. The widening of the Skagit River bridge to accommodate shoulder widths for a four lane interstate facility is not economically feasible given the truss type bridge construction. As a result, the interstate criteria cannot be met without either building a second bridge or total replacement. These improvements are too costly without additional capacity increases and are not included in this alternative.

♦ A preliminary analysis of vertical clearances was made to determine where deficiencies exist. The minimum interstate and state highway vertical clearance is 16'-1" with a desirable vertical clearance of 16'-6". Based on this analysis the following four bridge structures have substandard vertical clearances:

⇒ The I-5 under-crossings at Blackburn Street (Southbound clearance ranges from 14'-2" to 15'-1").

⇒ The I-5 over-crossing at Kincaid Street (SR 536) (Westbound clearance ranges from 14'-2" to 15'-7" and eastbound clearance ranges from 15'-0" to 16'-2").

⇒ The I-5 under-crossing at Second/Fourth Street (Northbound clearance ranges from 14'-4" to 14'-6" and southbound clearance ranges from 15'-6" to 15'-9").

⇒ The I-5 under-crossing at SR 11 (Chuckanut Drive) (Northbound clearance ranges from 15'-3" to 16'-8" and southbound clearance ranges from 15'-2" to 16'-5").

Total reconstruction of these bridges will be required for any alternative to comply with interstate and state highway criteria.

Consideration was given to the lowering of the I-5 elevation to increase the vertical clearance. However, it was determined that lowering of the I-5 grade would undermine the integrity of the overpass foundations. The remaining under-crossings within the study were originally designed to meet current, interstate vertical clearance standards. Because of the expense and possible environmental impact to improve the bridge with substandard vertical clearances, these improvements will not be included as part of this alternative.

TDM Strategies

TDM Strategies have become a recognized method to reduce congestion and improve air quality and are alternatives to more costly capacity improvement projects in urban and suburban areas. In high-density areas such as King County, commute trip reduction (CTR) legislation has been passed that requires any employer, with more than 100 employees in a single location, to increase the average vehicle occupancy rate. These employers have begun offering incentives and developing action programs to encourage their employees to use alternative modes of travel other than driving alone. These incentives and action programs have included financial incentives, flexibility in employee work hours to reduce their travel during peak commuting hours, and the option of tele-commuting.

The Mount Vernon/Burlington urban area is beginning to experience the kind of congestion that exists elsewhere in western Washington. However, this area does not meet the CTR requirements and is not regulated under state and federal laws requiring specific TDM programs because Skagit County has yet to reach the threshold requirements. For this alternative, the benefits of establishing a demand management program is reviewed at a sketch planning level to evaluate its effect on I-5 demand. In areas without several major employment centers, the strategies for TDM are different. TDM strategies for these areas must provide more convenient and attractive travel alternatives for its residents, such as more ridesharing opportunities and alternative means of travel including intercity rail and expanded transit service rather than financial incentives.

Some of the possible TDM strategies that are to be continued or implemented in the project include: expansion of park-and-ride lot program, increase in transit services and ridesharing programs, including fixed route service, demand response services, paratransit services, and intercity rail services, as well as deployment of non-motorized transportation programs. These strategies are briefly discussed below:

Park-and-Ride Lot Program - The project area currently has two park-and-ride lots that are operated by WSDOT. The first park-and-ride lot is located on the south side of Kincaid Street, adjacent to I-5. A second park-and-ride lot was recently built and located on the north side of George Hopper Road, adjacent to I-5. Local jurisdictions and WSDOT are exploring joint opportunities for future park-and-ride developments with WSDOT. Two locations have been identified in WSDOT's *State Highway System Plan: 1999-2018* as future park-and-ride lots. These lots are located at the I-5/Cook Road interchange for approximately 100 stalls. Another 100-stall park-and-ride lot was to be located on College Way near the existing train station in the city of Mount Vernon. (The city is now considering

a new multi-modal transportation hub in downtown Mount Vernon north of Kincaid Street and would relocate this lot to a convenient downtown location).

For this TDM/TSM alternative, two additional park-and-ride sites are suggested. These sites are located in the vicinity of the I-5/Anderson Road interchange and the I-5/SR 20 interchange. Local agencies and WSDOT should be involved with the planning of these future park-and-ride facilities to ensure that they provide adequate service to its residents. In planning and locating all of these future park-and-ride lots, considerations should be given regarding access to residential areas as well as convenient access for carpools and vanpools.

Demand Response Vehicle Program - Skagit Transit (SKAT) offers demand response vehicle services to areas of Skagit County that are not covered by the general transit service. Twenty-four (24) hour advance notice is required for any passenger who wants to schedule a ride with a demand response vehicle. Passengers are picked up by demand response vehicles at one of 34 designated demand response stops and transported to the nearest SKAT bus stop or transport point to make trip connection. SKAT should continue to work with Skagit County to establish additional designated demand response stops to meet the needs of its riders and provide more flexibility.

Paratransit Program - The Skagit Council on Aging (SCOA) provided door to door transportation service to the elderly and disabled residents at Skagit County before 1995. SKAT assumed the sole responsibility for serving the elderly and disabled citizens of the County on January 1, 1995. As of April 1996, SKAT has a paratransit mini-bus/mini-van fleet of fourteen (14) vehicles, equipped with wheelchair lifts. As the population of senior citizens continues to grow, demands for paratransit services are expected to increase as well. SKAT should continue to work with Skagit County and other relevant agencies to develop strategies for expansion of paratransit fleet.

Non-Motorized Transportation Program - Both cities of Mount Vernon and Burlington have adopted non-motorized transportation plans. The cities are cooperating to develop an integrated bike/pedestrian path system, as part of their comprehensive plans. The County portion of the path system will depend on both the existing road system and old railroad right-of-way. The City part of the path system will use selected arterials and collector streets, with separate paths in some locations. As WSDOT improves its state highways in Skagit County they should include paved four-foot shoulders, at a minimum, along all state roads for pedestrian and bicycle use as well as for emergency pull-off areas.

The cities of Mount Vernon, Burlington and Sedro Woolley will serve as "hubs" of this bike/pedestrian path system by providing connections between the radiating County system to major activities within the cities. The cities of Mount Vernon, Burlington and Sedro Woolley, and Skagit County should continue to work with WSDOT to develop their non-motorized transportation programs, as outlined in their comprehensive plans.

Expanded Transit Service - SKAT currently serves the project area by operating seven (7) bus routes: Routes 101, 203, 205, 207, 208, 300, and 615, as well as a Boeing express service. These routes generally operate at one-hour headways. Local jurisdictions and WSDOT should work with SKAT to encourage the residents to use this alternative mode of transportation. SKAT is in the initial stage of developing its 20-year long range transit program. For this alternative, headways for transit routes 101, 203 and 615 are expected to increase to 30 minutes and routes 205, 207, 208 and 300 are expected to increase to 15 minutes during peak periods by 2020. In addition, new transit routes to the Western Washington University campus in Bellingham, the Boeing facilities in Everett, and the future

Sounder commuter rail station in Everett are proposed. The cities, county and SKAT should work together to develop these and other possible transit service expansions outlined in SKAT's long range transit program when it is finalized. As county and state roads are being improved, provisions for transit stops and shelters that meet American Disabilities Act (ADA) requirement should be incorporated in the design and construction of these roadways.

Intercity Rail Program - The multi-modal facility in the city of Mount Vernon serves as a station for the passenger rail link between Seattle and Vancouver, B.C. and beyond. The average passenger rail trip from Seattle to Vancouver, B.C. takes 3 hours and 55 minutes. Currently, WSDOT, British Columbia and Burlington Northern Santa Fe (BNSF) railroad are investigating track and equipment upgrades to reduce this travel time to less than three hours by 2018.

The primary passengers who use this intercity rail are people traveling for business, schooling, tourism, and shopping. Currently, there is one daily round trip service for the Seattle-Vancouver, B.C. route. The Seattle-Vancouver, B.C. daily round trip service is projected to increase to four round trips by year 2018. Currently, commuters in the project area are not likely to use the rail service due to its schedule. When the service frequencies of the intercity rail are increased, residents of the project area can more conveniently use this service as an alternative mode of transportation for trips to and from destinations outside of Skagit County.

ARTERIAL BY-PASS ALTERNATIVE

A major arterial by-pass route between Anderson Road and SR 20 in the study area is being considered as an alternative to increasing capacity of I-5. Since there is a high percentage of short trips on I-5 to cross the Skagit River and reach destination points within the study area, this By-Pass Alternative was developed. This alternative would provide a separate route for local traffic to travel between the cities of Mount Vernon and Burlington without having to use I-5 or the new Riverside Drive/Burlington Boulevard bridges over the Skagit River. A new third bridge to cross the Skagit River in the urban area is included as part of this alternative. The purpose of this by-pass alternative is to encourage local trips on the arterial routes between the urban area and leave I-5 for longer regional trip purposes.

The alternative by-pass route begins at the I-5/Anderson Road interchange, follows Anderson Road to a point about one mile east, turns north and connects to LaVenture Road. The route follows LaVenture Road to Hoag Road where alternative crossings of the Skagit River are under consideration. After crossing the Skagit River, the by-pass route will continue in a northerly direction along the west side of the existing levee to an extension of District Line Road. The new alignment will then turn north, cross Lafayette Road and the existing railroad line and intersect with SR 20 at District Line Road.

Connections to this new arterial may include: George Hopper Road, Pease Road, Skagit Street, Gilkey Road/Section Street, Rio Vista Avenue and Lafayette Road. Proposed typical cross-sections for the widening of existing arterials and the development of new arterial segments were developed using design criteria and standards from Mount Vernon, Burlington and Skagit County. The typical cross-sections vary by area and are presented with the discussion below.

Segment Descriptions

Segments of the arterial by-pass alternative are described as follows:

Anderson Rd. from the I-5 Interchange to the Maddox Creek Bridge - Anderson Road would be widened from the existing two-lane road to a five-lane urban section with sidewalks and bicycle lanes. One to three new traffic signals may be required at the following intersections: I-5 ramps, Cedardale

Road, and Blodgett Road, depending on traffic conditions and results of signal warrant studies. The existing bridge or culvert crossing Maddox Creek needs to be widened or replaced.

New Alignment from Anderson Road near the Maddox Creek Crossing to Fowler Street Road via a New Arterial Extension of LaVenture Road - At a point east of the Maddox Creek, the by-pass alignment would turn northerly on a new arterial, roughly following the eastern property line east of Maddox Creek. The new arterial alignment will curve northward and intersect with Fowler Street. A typical section for the new arterial alignment is illustrated on Exhibit 5. The new arterial would be designed as a four-lane, urban cross-section with bicycle lanes and sidewalks on both sides.

The new alignment corridor is through mostly undeveloped forest and meadow. Future interconnected signals at the Blackburn Road and Fowler Street intersections may be required as traffic increases and signal warrants are met. No other intersections are needed until the surrounding land develops. A new bridge or culvert is required for crossing Maddox Creek.

Existing Alignment along LaVenture Road from Fowler Street to Hoag Road - The existing cross-sections vary throughout this segment with various sections completed to urban cross-sections and other sections partially widened to urban design along developed frontage from previous rural two-lane cross-section. The new roadway pavement width will be in accordance with the Mount Vernon's Comprehensive Plan. This roadway will generally be a four-lane facility with varying pavement widths of 40-feet to 48-feet and sidewalks on both sides. On-street parking will be prohibited along the LaVenture Road. Where the urban cross-sections have been completed, the roadway width varies from four-lane to five-lane sections with additional turn lanes at some intersections. Typical sections for the improved arterial alignment through this area are illustrated on Exhibits 6, 7 and 8.

LaVenture Road has three, existing signalized intersections, located at Division Street, Fir Street and College Way. LaVenture Road also has five lanes including left turn pockets at the intersections of Division Street, Fir Street and College Way. A new signalized intersection may be required to replace the existing four-way stop controlled intersection at Section Street.

Concepts for Crossing the Skagit River - Three alignment and crossing concepts for a new bridge over the Skagit River are being considered for this arterial by-pass alternative. Possible alignment concepts are illustrated at the top of Exhibits 6, 7 and 8 and discussed below.

- **Concept 1: Extend North from LaVenture Road to a Crossing of the Skagit River on an Extension of George Hopper Road** - A new alignment extends straight north from the existing LaVenture Road (Francis Road) to descend from the hilltop to the flood plain of the Skagit River. The roadway section will be widened from an existing two-lane rural cross-section to a four-lane urban cross-section from Hoag Road to where the existing road curves east. The new portion of the alignment would be mostly constructed on a viaduct structure, since the fill height for an embankment alternative would be approximately 80-feet high.

  Once the profile for the alignment is low enough to permit the construction of an embankment, an embankment cross-section with opening for flood waters can be used to keep the roadway above the flood plain. The alignment then crosses the Skagit River on a new four-lane bridge structure. After crossing the Skagit River, the new arterial alignment turns north and follows the existing levee on an embankment cross-section.

  An extension of George Hopper Road will also be included in this alternative. This extension will continue west on a new structure over Whitmarsh Road and the BNSF Railroad and join

EXHIBIT 5

EXHIBIT 6

EXHIBIT 7

EXHIBIT 8

the existing roadway in the vicinity of Burlington Boulevard. New signalization may be required at Hoag Road/LaVenture Road and at the New Arterial/George Hopper Road extension intersection. A signalized intersection may also be required for the existing LaVenture Road/Francis Road intersection.

- **Concept 2: Extend North from Hoag Road at a New Intersection in the Vicinity of 18th Place North to a Skagit River Crossing –** The arterial alignment turns west at Hoag Road to a new intersection in the vicinity of 18th Place North. The new arterial alignment turns north on a new embankment section (or low viaduct) to keep the roadway above the flood plain. The new arterial alignment will continue north along the south/east bank of the river. A small bridge will be required to cross an unnamed creek. The alignment will continue north and then curve west to align with an extension of George Hopper Road. The alignment then crosses the Skagit River on a new four-lane bridge structure. After crossing the Skagit River, the new arterial alignment turns north and follows the existing levee on an embankment cross-section.

  An extension of George Hopper Road will also be included in this alternative. This extension will continue west on a new structure over Whitmarsh Road and the BNSF Railroad and join the existing roadway in the vicinity of Burlington Boulevard. Hoag Road will be widened from an existing two-lane roadway to a four-lane urban concept in accordance with the Mount Vernon Comprehensive Plan. New signalization may be required at Hoag Road/LaVenture Road and at the New Arterial/George Hopper Road extension intersection.

- **Concept 3: Extend North from Hoag Road at a New Intersection East of Existing Railroad Bridge and Cross over the Skagit River on a Parallel Bridge –** The arterial alignment turns west at Hoag Road to a new intersection just east of the existing Railroad crossing. The new arterial alignment turns north and crosses the Skagit River on a new four-lane bridge structure parallel to the existing, railroad bridge. The arterial alignment will touch down in the vicinity of the abandoned Puget Sound and Cascade Railroad right-of-way and west of the existing levee. The new arterial alignment continues north and follows the existing levee on an embankment cross-section.

  An extension of George Hopper Road will also be included in this alternative. This extension will continue east from its intersection with Burlington Boulevard and cross over Whitmarsh Road and the BNSF Railroad on a new structure and intersect with the new arterial alignment west of the existing levee. Hoag Road will be widened from an existing two-lane roadway to a four-lane urban concept in accordance with the Mount Vernon Comprehensive Plan. New signalization may be required at Hoag Road/LaVenture Road and at the New Arterial/George Hopper Road extension intersection.

Skagit River to SR 20 - The new arterial alignment will roughly parallel the existing levee along the west/north bank of the Skagit River and intersect with SR 20 in the vicinity of District Line Road. The new alignment will be on an embankment cross-section to raise the roadway out of the flood plain. The segments of the arterial by-pass alignment are located partially within the city of Burlington and partially in Skagit County. The segment of the new arterial within the city of Burlington extends from the Skagit River to an approximate extension of Gardner Road. This section, illustrated on Exhibit 9, will have a four-lane urban cross-section with bike lanes and sidewalks on both sides.

Exhibit 9

Three new intersections will be used to connect the existing street system with the new arterial alignment within the city of Burlington. These new intersections will be connected to the following existing roads:

- Pease Road
- Skagit Road
- Section Street/Gilkey Road

These existing city roads/streets will extend to the new arterial alignment, matching existing cross-sections and using current city standards.

The segment within Skagit County extends from an approximate extension of Gardner Road to the SR 20/District Line Road intersection. This segment, as illustrated on Exhibit 10, will be designed in accordance with County standards to a four-lane rural cross-section with shoulders that can be used for bicycles, pedestrians and emergencies. Two new intersections will be used to connect the existing street system with the new arterial alignment in the Skagit County segment. These new intersections will be connected to the following existing roads:

- Rio Vista Road
- Lafayette Road Extending from Monroe Road.

These existing county roads will be extending to the new arterial alignment, matching existing cross-sections and using current county standards. Lafayette Road will also be realigned at District Line Road to move their intersection south and away from the new at-grade railroad crossing. This should improve the safety of the new at-grade railroad crossing and reduce traffic conflicts.

Other Common Components

Other important components of this alternative that will affect right-of-way needs include utility relocations and storm water management. Each of these components is discussed below.

Utilities - There are several utilities, including combined sewer lines, storm water lines, water pipes, gas lines, power lines and cable. Many of these facilities will need to be relocated and upgraded to meet current standards. Coordination with the various utility companies will be required for the implementation of this alternative. All utilities should be reviewed and extended under or over the new roadway sections.

Storm Water Management - Along an improved arterial alignment, storm water run-off is currently discharged into ditches or pipes and/or channeled into city facilities. Many of these facilities do not have adequate capacity for current run-off. The adding or widening for the new arterial alignment will increase the run-off amount. Proper storm water collection, treatment, conveyance, holding areas and management system need to be designed to meet current local and state design standards and environmental requirements. Because of down stream capacity problems and the close proximity of the Skagit River, the storm water drainage design requirements may extend to include a retrofit design for the existing roadway. This new storm water management system may need additional right-of-way for treatment and storage areas.

EXHIBIT 10

I-5 WIDENING ALTERNATIVE

This alternative provides major capacity improvements to I-5 by roadway widening. Two roadway-widening options are consider for this alternative. These options are:

1. I-5 is widened to an ultimate width of a six-lane facility with a minimum median area to minimize right-of-way acquisition and impacts. To meet current design practices, this section needs a minimum right-of-way width of about 164 feet without retaining walls and/or barriers and depends on the side slopes to match the existing ground profile in urban areas. An additional 22 feet on both sides is desirable for rural areas.
2. I-5 is widened to include a six-lane facility with proper inside and outside shoulders and additional space in the median to add future general purpose or high occupancy vehicle (HOV) lanes. This section requires a minimum width of approximately 188 to 204 feet without retaining walls and/or barriers and could be wider depending on the side slopes needed to match the existing ground profile. An additional 22 feet on both sides is desirable for rural areas.

In general, some additional right-of-way acquisition and/or retaining walls will be necessary at most interchanges, since the ramps will have to be realigned to match the selected widening option. Further study of the ramp configuration alternatives for operation improvements may yield still more right-of-way needs. Additional study is also needed to determine where stormwater management facilities can be sited, and where wetlands and other sensitive areas are located. These project elements will affect right-of-way and retaining wall needs and may have significant impact on the overall project cost.

Cross Sections

Existing conditions control the selection of widening cross-sections. From a review of the I-5 alignment in the study area, four basic concepts or strategies for roadway widening have been developed for various sections along I-5. These widening concepts or strategies include: Symmetrical Widening, Hillside Widening to the West, Hillside Widening to the East, and Embankment Widening to the East. These roadway concepts/strategies are discussed below as well as location where they are applicable. Various exhibits showing existing and proposed cross-sections have also been developed to illustrate the concepts.

Symmetrical Widening (from Hickox Road to south of Blackburn Road; from south of Blackburn Road to Section Street vicinity; and from George Hopper Road to Cook Road) - For most of the I-5 alignment, it is feasible and desirable to widen the existing roadway symmetrically on both sides of the existing centerline. The existing right-of-way along I-5 is generally adequate to allow both of the options to be constructed without retaining walls from Hickox Road to Blackburn Road and from George Hopper Road to Cook Road. This concept is also applicable between Blackburn Road and Section Street, although some right-of-way acquisition and/or retaining walls will be necessary depending on the roadway option selected.

The existing roadway section (Hickox Road to south of Blackburn Road; George Hopper Road to south of SR 20; and south of SR 11 to Cook Road) has four lanes with an unpaved median strip. The existing median including 4-foot paved shoulders is approximately 40 feet wide. The existing roadway section from south of Blackburn Road to the vicinity of Section Street has four lanes with a 12-foot paved median strip. The existing roadway section from south of SR 20 to south of SR 11 has four lanes with a 14-foot paved median strip.

Typical cross-sections for the symmetrical widening of I-5 through these sections are illustrated on Exhibits 11, 12 and 13.

Hillside Widening to the West (Section Street to Division Street) - Between Section Street and Division Street, the vertical profile of Kincaid Street/Broad Street below the I-5 over-crossing prevents widening to the east because of low vertical clearance problems. A long steep grade, in excess of 12 percent, currently descends down Broad Street on the east side of I-5. Widening to the east side of I-5 would require the grade of Broad Street to be increased. As a result, nearly all roadway widening in this area including the Kincaid Street/Broad Street over-crossing is expected to occur west of I-5. Right-of-way is at a premium since this segment is within the urban core of Mount Vernon. This alignment will also impact the proposed multi-modal center in downtown Mount Vernon, north of Kincaid Street. More detailed engineering studies will be conducted to determine if the grade on Broad Street can be adjusted to permit widening to the east while maintaining proper vertical clearance under I-5.

The existing roadway through this segment has four lanes with a 12-foot paved median and concrete median barrier. The existing ramps on the west side are constructed on a retained embankment. It will be necessary to acquire additional right-of-way, construct retaining walls and realign the ramps for the freeway widening. Typical cross-sections for the hillside widening to the west through this section are illustrated on Exhibit 14.

There is also a sight distance deficiency in the existing profile of I-5 at the Kincaid Street over-crossing. As a result, the profile of the existing I-5 lanes would also be raised. This change in profile would allow the sight distance deficiency to be corrected to meet 60 and 70-mph standards. The raising of the overpass structure will improved the low vertical clearance problem under the I-5 structure for Kincaid Street (SR 536), as described earlier. As a result, the existing ramps and retaining walls on the west portion of the interchange as well as the existing bridge structures will be demolished and reconstructed.

New right-of-way on the west side of I-5 between Section Street and Division Street would be required to relocate the Kincaid Street southbound off ramp for both options and some additional land for the main line widening for the wide median option. More detailed engineering analysis is required to determine if some of the widening can be to the east without causing vertical clearance problems for Kincaid Street/Broad Street and thus reducing the right-of-way needs.

Hillside Widening to the East (Division Street to Railroad/Cameron Way) - Between Kincaid Street and Division Street, the I-5 widening would transition from the west side of I-5 to the east side. Between Division Street and the Railroad/Cameron Way over-crossing, the widening to the west is prevented by the presence of the BNSF Railroad, Freeway Drive and the Skagit River. It is also constrained by the steep hillside on the east, so right-of-way acquisition needs to be minimized. The existing roadway through this segment has four lanes with a narrow paved median and concrete median barrier. High retaining walls along the east edge of the existing roadway hold up the hillside.

Because of the west side constraints, this section should be widened to the east. Two variations are used in the development of these cross-sections. For the ultimate narrow median, six-lane design, the typical cross-section for the hillside widening to the east is illustrated on Exhibit 15. For this section the widening is expected at the same approximate grade of the existing roadway and extends into the hillside with adjustments for sight distances. The existing retaining walls will be demolished and new walls constructed in the proper location for a six-lane roadway.

EXHIBIT 11

EXHIBIT 12

EXHIBIT 13

EXHIBIT 14

EXHIBIT 15

The Second Street Overpass needs to be reconstructed at the same time as the roadway is widened to allow for optimum column spacing and reduce right-of-way needs. New right-of-way along the east side of I-5 is required to construct the new mainline lanes and proper shoulders. Additional right-of-way may be required depending on retaining wall requirements and relocation of local streets.

For the wide median, six-lane design option, the roadway widening can occur in the same manner as the narrow median option but a new higher retaining wall on the east side would be required. A detailed engineering analysis will be required to determine the best type of retaining wall for this section.

To reduce the required excavation, the new northbound lanes could take place at a higher elevation depending on the clearance under a new Second Street Overpass structure. A typical cross-section for this wide median, six-lane design is also illustrated in Exhibit 15. The existing retaining walls can remain until the additional general purpose/HOV lanes are warranted. A new three-lane northbound roadway section would be constructed to the east of the existing retaining wall. This would leave a 24-foot section of unused pavement from the existing northbound lanes for future widenings. A new retaining wall on the east side of the new northbound lanes would be used to minimize right-of-way needs. A new Second Street Overpass would need to clear span the existing four-lane roadway sections and a second span over the new northbound lanes. This option requires approximately 28-feet more right-of-way along the east side of I-5 to construct the new mainline lanes than for the narrow median option. Additional right-of-way may also be required depending on retaining wall requirements and relocation of local streets.

Embankment Widening to the East (Railroad/Cameron Way to George Hopper Road) - Freeway Drive and the Skagit River prevent substantial widening to the west between the Railroad/Cameron Way over-crossing and College Way. The cross-section for this area is shown with widening to the east on an embankment that raises the roadway above the surrounding area and out of flood plain. A new retaining wall along the east side of this section is required to minimize right-of-way acquisition. A typical section for the Railroad/Cameron Way Overpass is illustrated on Exhibit 16. This cross-section with widening to the east is continued from College Way to north of the Skagit River.

The widening of the existing Skagit River bridge to accommodate either roadway widening option is not feasible given the truss type bridge construction. As a result, the roadway widening requires the construction of a second bridge for northbound traffic or total replacement as illustrated on Exhibit 17. A new six-lane bridge would be built for the minimum six-lane option or a new three-lane wide parallel bridge can be built for the wide median option and designed for easy expansion. The placing of the parallel bridge to the east and continuing the widening to this side simplifies alignment, construction, and traffic phasing. The existing roadway has four lanes with a narrow paved median and concrete median barrier.

Between the Skagit River Bridge and George Hopper Road, the roadway cross-section transitions back to the symmetrical widening section. The minimum six-lane option can be constructed in the existing right-of-way; however, the wide median, six-lane options may require some right-of-way depending on retaining wall type and requirements. Cameron Way may have to be relocated to the east due to construction and right-of-way needs.

EXHIBIT 16

EXHIBIT 17

Other Common Components

Other important components of this alternative that will affect right-of-way needs include bridges and interchanges, utility relocations and storm water management. Each of these items is discussed below.

Bridges - There are 14 existing bridge structures within the study area. Seven of these structures are under-crossings of other roadways, four are over-crossings of other roadways, two are crossings over of minor streams/drainage ditches, and one crosses over the Skagit River.

These bridge structures are discussed below by category.

- **Under-crossings** For this study, the term "under-crossing" refers to the location of I-5 in relationship to the cross street. In this case, I-5 is below the grade of the various cross streets, which is on the structure.

  ⇒ **Hickox Road, Anderson Road, and George Hopper Road** These three under-crossings occur within segments with symmetrical widening. These bridges can accommodate the narrow or wide median, six-lane design options with minor wall construction at the toes of the existing embankments for the crossing roadway and culverts to convey runoff in the roadside ditches through these embankments. Further study is required to verify that vertical clearance requirements can be met and if seismic improvements are necessary.

  ⇒ **Blackburn Road and Second Street** These two under-crossings need to be replaced since they are deficient in vertical clearance over I-5 and lack the required horizontal clearance for roadway widening. Redesigning these structures is required to widen I-5 for both narrow and wide median six-lane sections. Various replacement alternatives for Second Street Overpass are being considered in a separate section of this study. The Second Street Overpass should be widened to accommodate a three-lane roadway section with bike lanes and sidewalks. The Blackburn Road under-crossing will be replaced with a bridge that can accommodate four lanes, bicycle lanes and sidewalks on the bridge.

  ⇒ **SR 11**: This under-crossing occurs within a segment with symmetrical widening. These bridges can accommodate the narrow median, six-lane design with paved median and concrete median barrier. The wide median, six-lane design with unpaved median cannot be accommodated without replacement of the bridge(s). An adjustment of the SR 11 bridge profile would be desirable over the I-5 lanes to provide proper vertical clearance. Further study is required to determine if seismic improvements are necessary.

  ⇒ **Cook Road** This under-crossing needs to be replaced since it lacks the required horizontal clearance for roadway widening. A redesign of this structure is required to widen I-5 for both the narrow and wide median six-lane sections. The Cook Road under-crossing will be replaced with a bridge that can accommodate an ultimate roadway width for 4 lanes with shoulders for bicycle and pedestrian use.

- **Over-crossings** For this study, the term "over-crossing" refers to the location of I-5 in relationship to the cross street. In this case, I-5 is on a structure above/over the various cross streets, railroad or other physical feature.

  ⇒ **Kincaid Street** This over-crossing occurs within the segment of hillside widening to the west. A new southbound bridge is proposed in each widening alternative. Also, there is an existing sight distance deficiency that needs to be corrected for both the southbound and

northbound alignments that will require the existing structure to be redesigned. The over-crossing marks the beginning of the transition from west side widening to east side widening. The over-crossing is also deficient in span length to accommodate the ultimate plan to widen Kincaid Street to a six-lane roadway. Hence, the over-crossing must be replaced in each alternative.

⇒ **Railroad Crossing/Cameron Way** This over-crossing occurs at the transition from the segment with hillside widening to the east to the segment with embankment widening to the east. The existing bridge will need to be either widened or a separate bridge constructed for the northbound lanes. A separate bridge might be necessary when the profile of the northbound and southbound roadways are different. Ease of construction and reduced impact on the existing traffic lanes during construction also favor a separate bridge. Further study is required to verify that vertical clearance requirements over the BNSF Railroad and Cameron Way can be met and if seismic improvements are necessary for the existing bridge. A 40-foot roadway section needs to be maintained for Cameron Way.

⇒ **College Way** This over-crossing occurs within the segment with embankment widening to the east. The existing bridge will need to be either widened or a separate bridge constructed for the northbound lanes. The existing structure foundations need to be modified to accommodate a future six-lane College Way under I-5. Ease of construction and reduced impact on the existing traffic lanes during construction favor a separate bridge. Further study is required to verify that vertical clearance requirements can be met and if seismic improvements are necessary.

⇒ **SR 20** This over-crossing occurs within a segment with symmetrical widening. There are two existing bridges for the over-crossing to separate southbound and northbound lanes. Both the southbound and northbound bridges need to be widened to accommodate the roadway widening options. Further study is required to verify that vertical clearance requirements can be met and if seismic improvements are necessary. The re-design of these structures needs to be coordinated with the SR 20 Widening Project and the Interchange Re-design Project.

⇒ **Gage Slough and Joe Leary Slough (Stream Crossings)** These two stream crossings occur within the segment with symmetrical widening. There are two existing bridges on each slough/stream crossing to separate southbound and northbound lanes. These stream crossing structures need to be widened to accommodate the roadway widening options. Further study is required to verify if there are hydraulic conditions needing improvement and if seismic improvements are necessary.

In addition, Martha Creek runs parallel to I-5 south of Kincaid Street and crosses under I-5 in a box culvert. This box culvert will need to be lengthened to accommodate the roadway widening options. Further study is required to verify if there are hydraulic conditions needing improvement.

⇒ **Skagit River Bridge** The existing bridge is a truss type that cannot be easily widened. A new bridge or second bridge needs to be constructed for any widening alternative. A new bridge for the northbound lanes is proposed because of alignment constraints at College Way. This location reduces the scour potential to the existing bridge and is less vulnerable to damage from a collapse of the existing bridge. Further study is required to verify if there

are hydraulic conditions needing improvement and if seismic improvements are necessary for the existing bridge.

Interchanges - There are eight existing interchanges within the project limits. These I-5 interchanges are located at the following cross streets: Hickox Road, Anderson Road, Kincaid Street, College Way, George Hopper Road, SR 20, SR 11, and Cook Road. The bridge sections for these interchanges are discussed above. The ramp junctions with the mainline lanes and at the cross street may require redesign, modifications and/or replacement depending on the roadway widening options and the widening concept or strategy. In addition, the partial diamond interchange at Hickox Road will be revised to a full diamond interchange by adding the southbound off-ramp and the northbound on-ramp. At some of the other interchanges, the entire ramp system will need to be modified. To minimize right-of-way, urban or single-point interchange with traffic signals or compressed diamond interchange may be required at many of the interchanges. Additional right-of-way will be needed at the Kincaid Street and the SR 20 interchanges. A detailed engineering analysis is required to determine the exact type of interchange improvements and revisions.

Utilities - There are several combined sewer lines, storm water lines and water pipes that cross under I-5 between Kincaid Street and north of Cameron Way. These utilities were re-constructed when I-5 was originally built. These utilities are currently in poor condition and access to them is difficult. It is suggested by the city of Mount Vernon that a combined utility corridor be constructed under I-5 during the widening project to accommodate these as well as other future utilities. In addition, overhead utilities may need to be modified or relocated for the various widening options. In the city of Burlington, the utilities have been upgraded and are in relatively good condition. These utilities should be reviewed and where necessary extended under the new roadway sections.

Storm Water Management - Along a majority of the existing I-5 alignment, storm water run-off from I-5 is currently discharged into ditches or pipes and/or channeled into city facilities. Many of these facilities do not have adequate capacity for current run-off. The widening of I-5 will increase the run-off amount. Proper storm water collection, treatment, conveyance, holding areas and management system need to be designed to meet current local and state design standards and environmental requirements. Because of down stream capacity problems and the close proximity of the Skagit River, the storm water drainage design requirements may extend to include a retrofit design for the existing roadway. This new storm water management system may need additional right-of-way for treatment and storage areas.

SECOND STREET OVERPASS ALTERNATIVES

The Second Street Overpass in Mount Vernon, Washington was originally constructed in 1928 to span over the railroad tracks and connect 2nd Street, at Washington, to 4th Street, south of Fulton Street. This was part of Old Highway 99, which was the main route north at that time. In 1953, the north 160 feet of the bridge was replaced to span over I-5. The total length of the existing bridge is 506 feet and currently spans over SR 536, railroad tracks and I-5. WSDOT is investigating alternatives to upgrade the structure to meet current design standards.

EXISTING CONDITIONS

The current roadway section on the Second Street Overpass consists of two 12-foot lanes with 5-foot sidewalks on each side. The vertical clearance over the I-5 northbound lanes is approximately 14.3 feet as opposed to the standard interstate vertical clearance of 16.5 feet. A photograph of the existing Second Street Overpass, looking north, is shown below:

Existing 2nd Street Bridge Feb. 2000

A review of the existing Second Street Overpass structure was conducted as part of this pre-design study. Some of the key findings from this initial analysis include:

- The substandard vertical clearance of the Second Street Overpass over I-5 is an obstacle to high loaded truck traffic on I-5. When these high loads strike the girders, costly repairs are required.
- To remedy the substandard clearance issue, consideration was given to lowering the surface of I-5 to provide greater vertical clearance. However, the bridge footings are too high to allow lowering of the I-5 surface without undermining the foundations for the overpass and requiring expensive underpinning.
- There is a problem with the curvature at the north end of the overpass bridge structure, as it connects to 4th Street. This curvature is very sharp and causes poor sight distance.
- The spans over SR 536 are also deficient in two ways. The vertical clearance over SR 536 is substandard and there is a pier in the middle of the roadway.

Overall, the Second Street Overpass is in very poor structural condition, which has resulted in a FHWA sufficiency rating of 39.1 (out of a possible 100). Any bridge with a rating of less than 50 is considered to be a good candidate for replacement. As a result of the vertical and horizontal deficiencies and poor structural condition, it was concluded that the Second Street Overpass needs to be replaced.

ALTERNATIVES FOR OVERPASS REPLACEMENT

Three alternative alignments were originally approved for further study by the project Steering Committee after the initial open house in November 1998. These alternatives included reconstruction on the same alignment, an alignment shifted to the south-side and a north-side alignment. Subsequently, the City of Mount Vernon requested that a fourth alternative be considered. This fourth alternative included a new alignment extending Division Street over I-5 and the railroad to tie into Freeway Drive, north of SR 536. These alternative alignments are discussed below.

- **Alternative 1: Same Alignment Alternative** - The basic alternative is to replace the existing Second Street Overpass with a new structure on the existing alignment with spans that would accommodate a future widening of I-5. This alternative is illustrated in Exhibit 18. Demolition and construction of the new structure was originally estimated to extend over two construction seasons and take approximately 16 to 18 months. However, based on a more detailed constructibility review by WSDOT, this construction time could be decreased to one construction season or about 8 to 12 months using a prestressed girder structural design. This new information was not available at the time of the public open house.

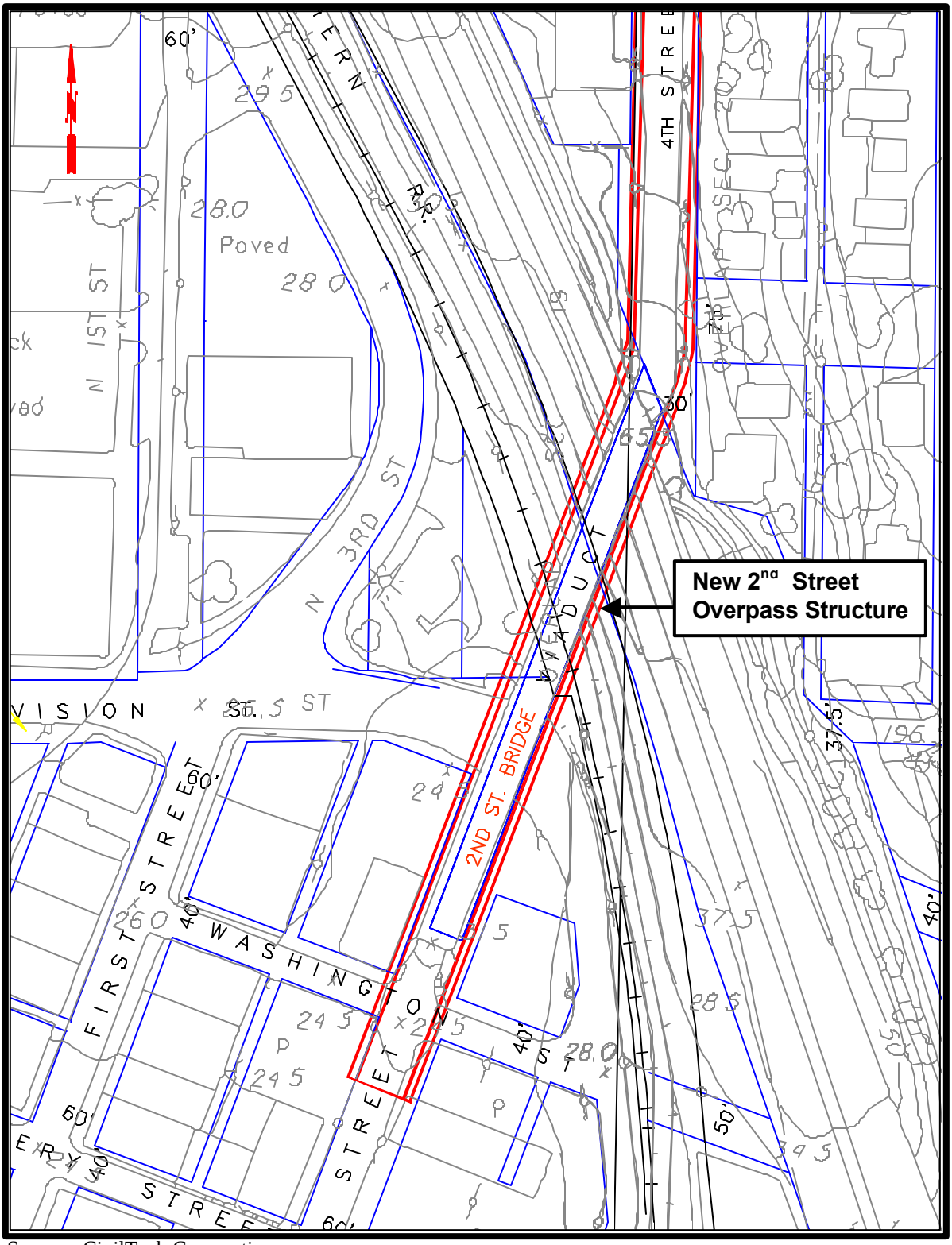
  A staged construction approach could also be developed that could maintain one traffic lane on the existing structure that would act as a one-way street while construction of northwestern portion of the new structure proceeds. Traffic could then be shifted to the new structure while the rest of the existing structure is demolished and the southeast side of the new structure is built. However, the staged construction approach would increase the over all construction period while providing limited traffic movements.

  Since the period of disruption to traffic is quite long, other alternatives were analyzed that could shorten the construction time and maintain traffic on the existing structure for as long as possible.

- **Alternative 2: South-side Alignment Alternative** - The second alternative would build the replacement bridge adjacent and parallel to the existing overpass structure on the south-side. This alternative alignment would maintain traffic on the existing structure until connections to the existing roadways need to be constructed. This south-side alternative is illustrated in Exhibit 19.

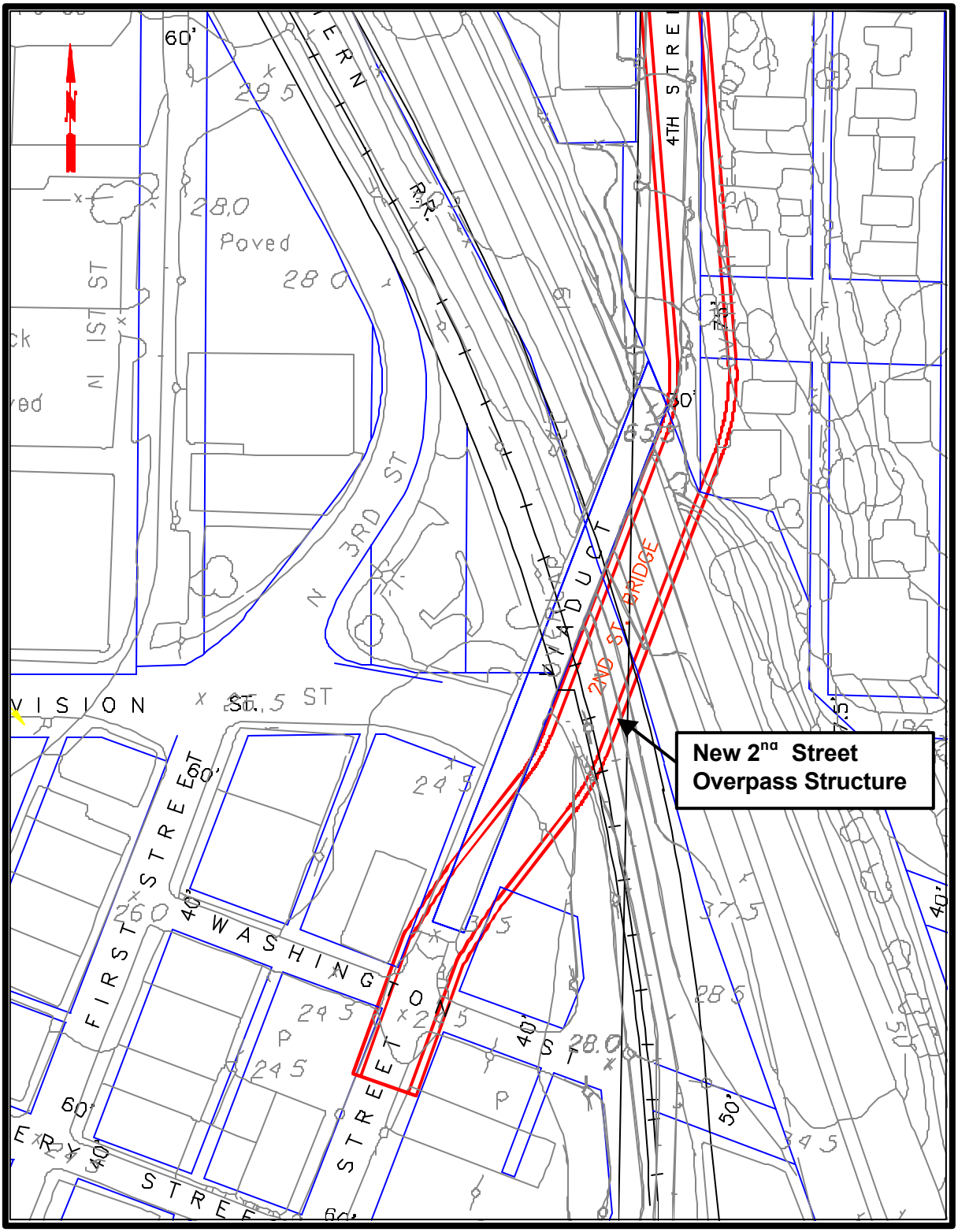
- **Alternative 3: North-side Alignment Alternative** - The third alternative would build the replacement bridge adjacent and approximately parallel to the existing structure on the north-side. The new north-side alignment will be approximately 0-feet to 60-feet north of the existing Second Street Overpass alignment which would reduce the skew angle and permit staged construction. A general concept for this alternative alignment is illustrated in Exhibit 20. As with the south-side alternative, it is possible to maintain traffic on the existing structure until connections to the existing roadways need to be constructed.

EXHIBIT 18
NEW SECOND STREET OVERPASS STRUCTURE ON EXISTING ALIGNMENT



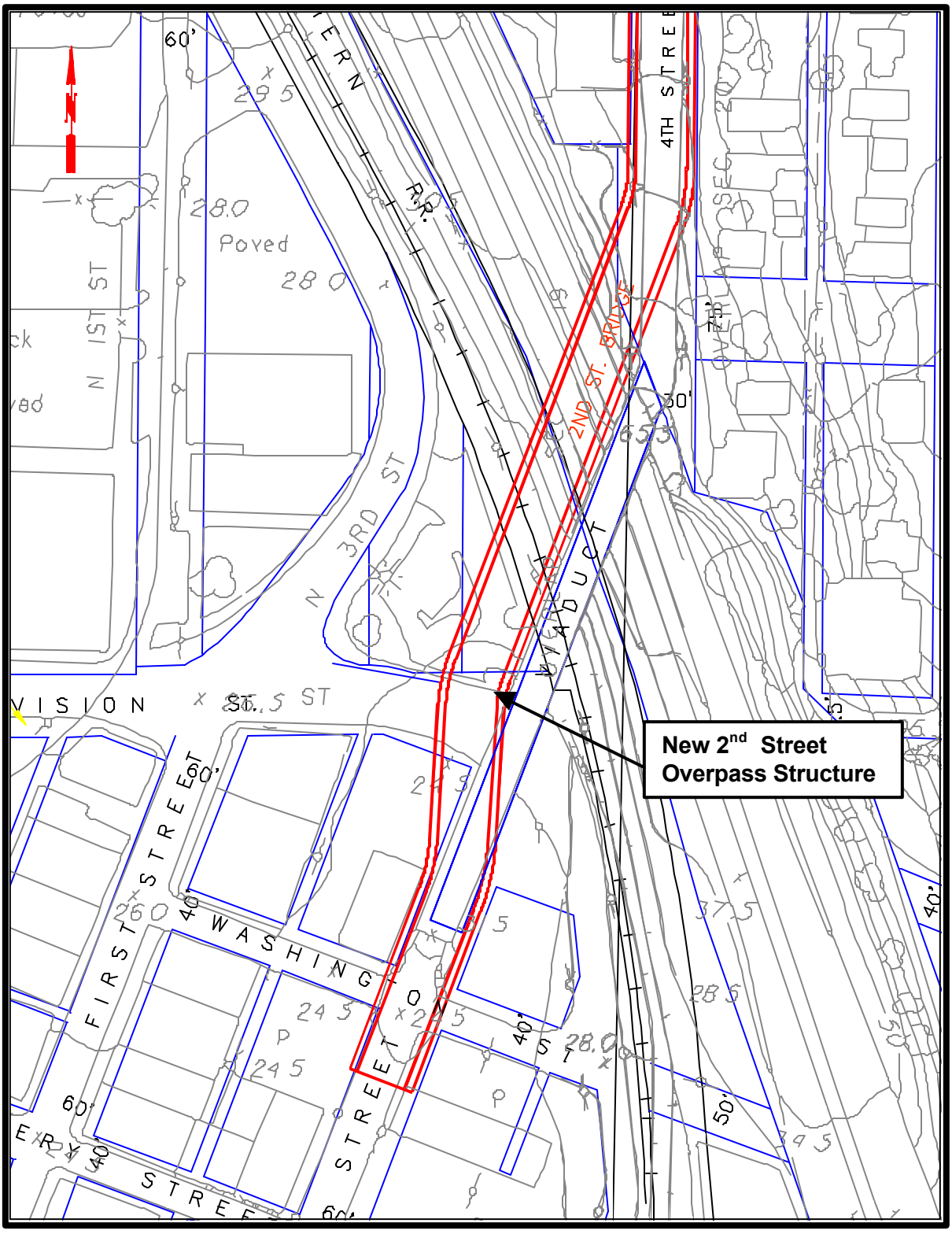
Source: CivilTech Corporation

EXHIBIT 19
NEW SECOND STREET OVERPASS STRUCTURE ON SOUTH-SIDE ALIGNMENT



Source: CivilTech Corporation

EXHIBIT 20
NEW SECOND STREET OVERPASS STRUCTURE ON NORTH-SIDE ALIGNMENT



Source: CivilTech Corporation

- **Alternative 4: Division Street Alignment Alternative** - The fourth alternative is to adopt an entirely new alignment for crossing I-5 from the downtown area. This alternative consists of extending Division Street from 6th Street west over I-5 and the railroad right-of-way and curve northward to meet grade with Freeway Drive, as illustrated in Exhibit 21. This alternative would also require that Freeway Drive be revised to intersect with 3rd Street (SR 536) instead of 1st Street. This alternative could be constructed while maintaining the existing Second Street Overpass or after Alternatives 1, 2 or 3 is built.

Bridge Structure Options

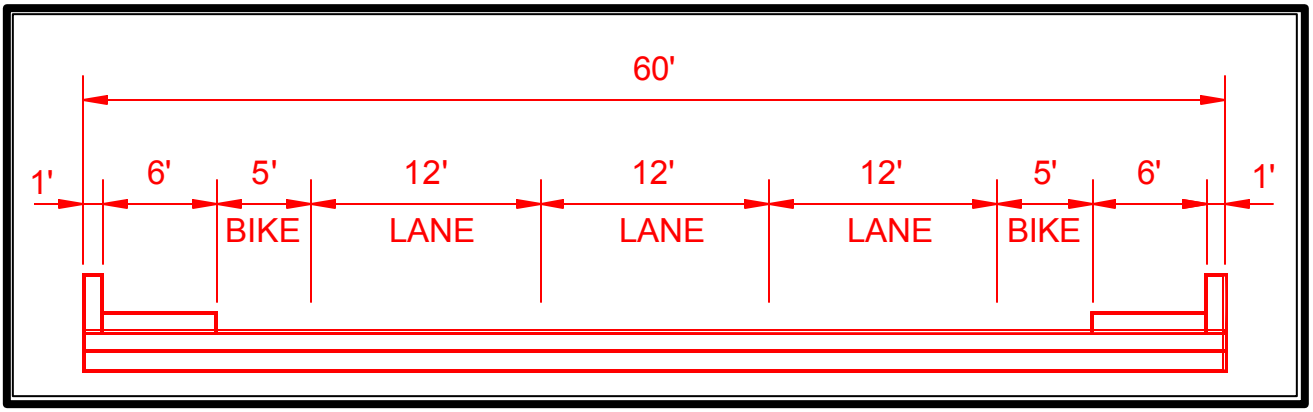
There are several options available for the bridge structures that would be appropriate for the new Second Street Overpass. The two most common types used in these span ranges are concrete box girders or precast beams. Steel girders could also used. Exhibit 22 presents bridge cross sections of the three different structure types. In general, steel structures require higher maintenance than concrete ones. Other considerations for the structure type include: precast concrete girders are widely used for freeway overpasses and are the most economical solution, while concrete box girders are usually considered more aesthetically pleasing in urban settings. One drawback with concrete box girders is that during construction, concrete box girders requires temporary false work, however this false work is not likely to worsen the existing low clearance problem. In addition, the concrete box girders are generally less deep than the precast option, which will improve the overall profile of the new Second Street Overpass.

Steel girders could be designed to be shallower than comparable precast concrete girders and are more readily adaptable to curved structures. Steel girders would be easiest and fastest to erect over I-5 traffic. Steel girders are also easier to adapt for future construction when I-5 is widened. However, the steel girders will require periodic painting and the cost of steel fluctuates depending on demand. As a result, concrete is considered to be the better option.

Roadway Cross-Section

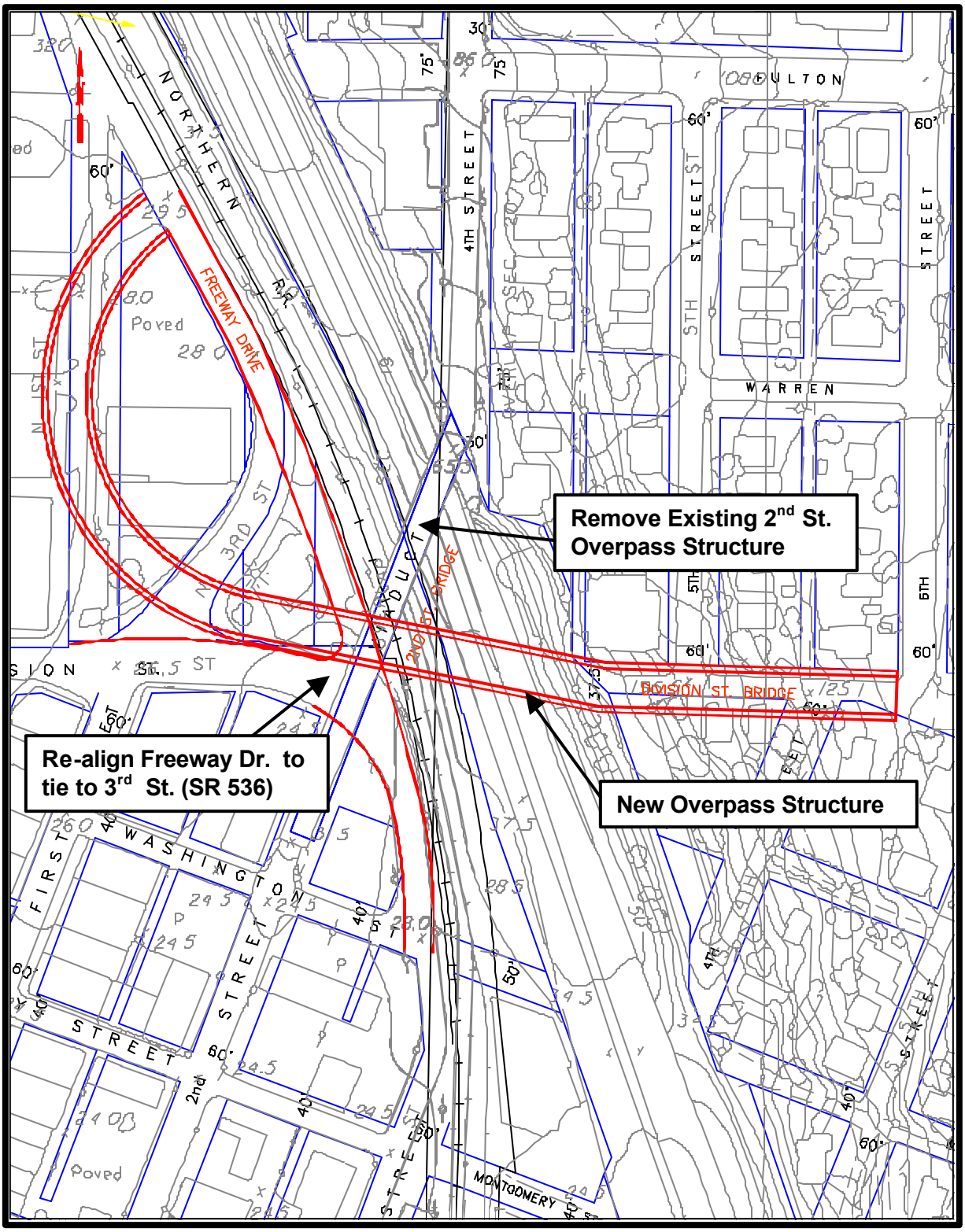
The roadway cross-section for all the alternatives presented in this analysis consists of three 12-foot lanes, two 6-foot sidewalks, and two 5-foot bike lanes for a total of 60 feet, as shown in Figure 6.

FIGURE 6
TYPICAL ROADWAY CROSS-SECTION ON NEW OVERPASS



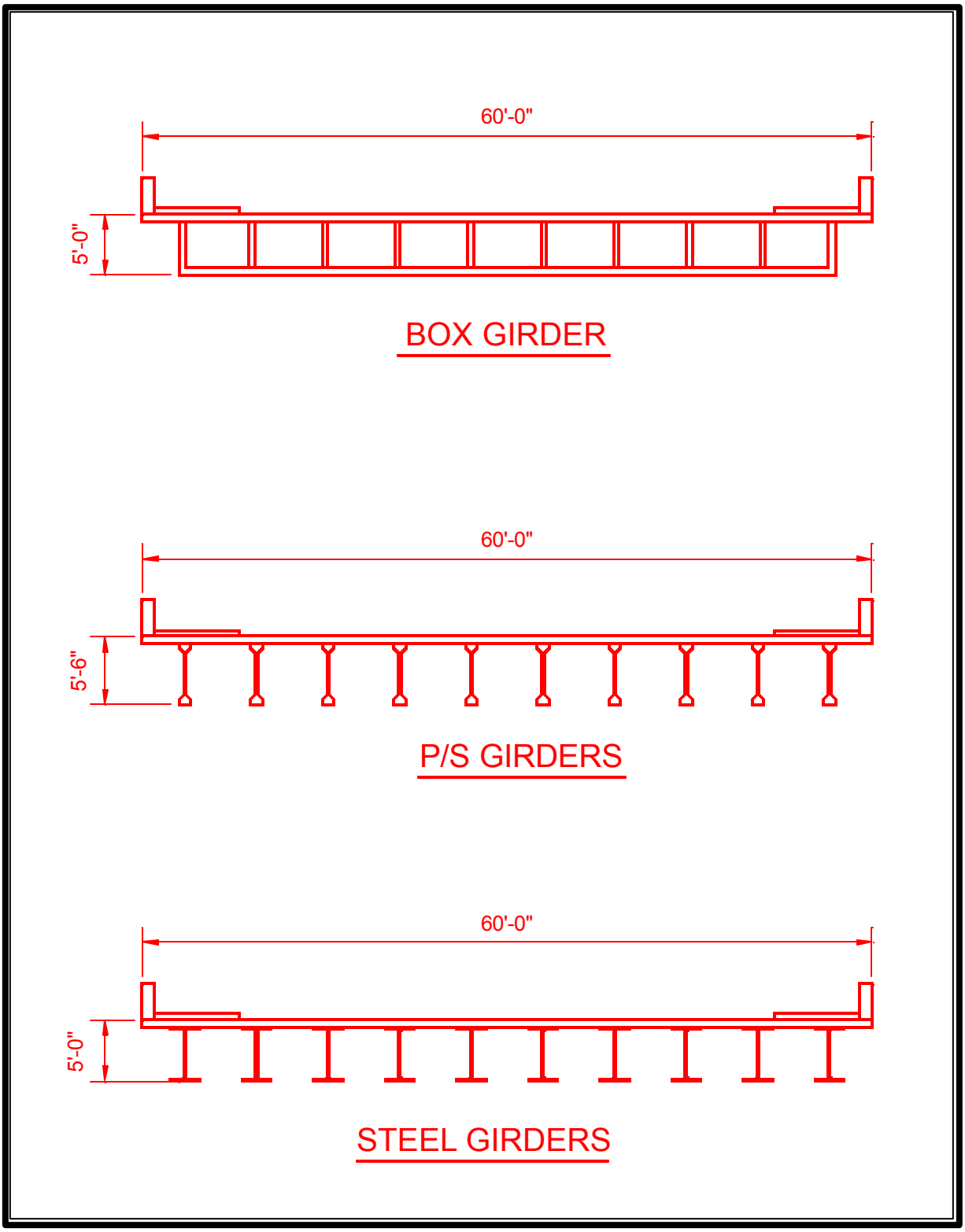
Source: CivilTech Corporation

EXHIBIT 21
NEW OVERPASS STRUCTURE ON DIVISION STREET ALIGNMENT



Source: CivilTech Corporation

EXHIBIT 22
POSSIBLE STRUCTURAL TYPES FOR NEW OVERPASS BRIDGE



Source: CivilTech Corporation

ANALYSIS OF SECOND STREET OVERPASS REPLACEMENT ALTERNATIVES

The alternatives analyzed for the replacement of the Second Street Overpass have some common components and impacts. These elements include:

- For the 2nd Street alignment alternatives, some adjustments to vertical grades will be done on 4th Street near the new structure because of a higher profile required to provide the desired clearance over I-5.
- Likewise, to improve the clearance over SR 536 and maintain a slope similar to the existing one, the touch-down point of the 2nd Street alignment alternatives will be south of Washington Street. This adjustment to the profile for the new structure will result in closing Washington Street at the overpass structure.
- The new 2nd Street overpass grade would have to be steeper or the touchdown point further south on 2nd Street for Alternatives 1 and 2 than for Alternative 3 to provide the same vertical clearance over SR 536.

Brief summaries of specific impacts related directly to each alternative alignment are presented in the following section.

Alternative 1: Existing Alignment

Alternative 1 is a replacement structure that is on the same alignment as the existing structure. Some of its impacts include:

- It has the least impacts to right-of-way and existing streets.
- Traffic on this new structure is expected to be the same as on the existing overpass.
- The existing sharp curve and poor sight distance on the north end of the structure would be improved within the right-of-way limits.
- The time that 2nd Street would be closed for construction of this alternative is the longest of those studied. With this alternative, traffic will be stopped on the first day of demolition. The original estimate of closure time was about 16 to 18 months. Based on a recent constructibility review by WSDOT this closure time was reduced to approximately 8 to 12 months using a prestressed girder construction.
- The public comments and ratings at the November 16, 1999 Open House indicated a mixed preference for this alternative with 50 percent or 17 out of the 34 comments either were strongly in favor or somewhat in favor of it.
- Although the cost of the structure for all Second Street alignment alternatives is essentially the same at approximately $10 million, this alignment alternative has the lowest overrun cost potential because it does not impact adjacent properties or require more rights-of-way.

Summary - This is a very viable alternative for functionality, geometry, and cost. The major drawback is the length of time (8 to 12 months) traffic on the Second Street Overpass would be affected during construction. This is an issue for SKAT would have to re-route some buses while the roadway is closed. A staged construction approach could be developed that could maintain one traffic lane on the existing structure that would act as a one-way street while construction of northwestern portion of the new structure proceeds. Traffic could then be shifted to the new structure while the rest of the existing structure is demolished and the southeast side of the new structure is built.

This alternative should be carried forward as a base case alternative in further environmental and preliminary engineering studies. A slightly shifting of the 4th Street end of this alignment to the north or west would improve the sharp skew angle at this end of the new structure.

Alternative 2: South-side Alignment

Some of the impacts resulting from this parallel south-side alignment alternative would include:

- Traffic on this new south-side structure is expected to be the same as on the existing overpass.
- This alternative would provide an acceptable geometric alignment. However, the alignment does include short-radius reverse curves on the south end to align the new structure with 2nd Street. Since the traffic speed will be below 25 mph at this point, the reverse curves are not expected to create a problem. At the north end of this alternative, the skew angle between the north abutment and the centerline of this south-side alignment is very flat. Structures with these flat angle skews do not perform well in seismic events.
- About 80 percent of the new bridge could be built while 2nd Street continued to function with little disruption. The closure time would be approximately 4 to 6 months, which is a substantial reduction over Alternative 1.
- The public comments and ratings at the November 16, 1999 Open House were not in favor of this alternative with 75 percent or 20 out of 27 comments either were strongly opposed or somewhat opposed to this alternative.
- The cost of the structure for this Second Street alignment alternative is estimated at approximately $10 million.
- Both ends of the new structure would require additional rights-of-way. The downtown portion of the new right-of-way would be through parking lots. The 4th Street end right-of-way acquisition would be residential.

Summary - This alternative improves the construction interruption on the Second Street Overpass. The roadway geometry of the alignment is reasonable. However, there is a sharp abutment skew angle at the north end of this alignment, which is expected to worsen as I-5 is widened. This sharp skew angle, which does not perform well in seismic events, is a fatal flaw in this alternative. As a result, Alternative 2 was dropped from further consideration.

Alternative 3: North-side Alignment

Some of the impacts resulting from this north-side alignment alternative would include:

- This alternative would provide an acceptable geometric alignment. The geometric alignment includes a short-radius reverse curve at the south end to align the new structure with 2nd Street. Since the traffic speed will be below 25 mph at this point, the curve will not create a problem. The north end of this alignment can be shifted northerly to improve the skew angle between the north abutment and the centerline of this north-side alignment.
- Traffic on this new north-side structure is expected to be the same as on the existing overpass.
- As with the south-side alignment, about 80 percent of the new bridge could be built while 2nd Street continued to function with little disruption. The closure time is estimated to be approximately 4 to 6 months, which is a substantial reduction over Alternative 1.

- This alternative could also be built using a staged construction approach that would minimize traffic impacts; however, this approach would also increase the overall cost.
- The public comments and ratings at the November 16, 1999 Open House indicated a strong preference for this alternative with 28 out of 38 comments or 73 percent were strongly in favor of this alternative with another 15 percent somewhat in favor of it.
- Both ends of the new structure would require additional rights-of-way. The downtown portion of the new right-of-way would be on parking lots and commercial property. The 4th Street end right-of-way acquisition would be minimal to none.
- The cost of the structure for this Second Street alignment alternative is estimated at approximately $10 million.

Summary – This alternative improves the construction interruption on the Second Street Overpass. The roadway geometry is acceptable. This alternative should be carried forward for more environmental and preliminary engineering analysis and design. It received the highest public rating during the public Open House and seems to be the best choice for replacement of the existing Second Street Overpass.

Alternative 4: Division Street Overpass Alternative

The Division Street Overpass Alternative provides an entirely different alignment for crossing I-5 into the downtown core of Mount Vernon. This alternative extends Division Street west from 6th Street, crosses over I-5 and the railroad rights-of-way and connects to Freeway Drive north of a new 3rd Street (SR 536) and Division Street intersection. Some of the impacts resulting from this alternative include:

- The geometry of this alignment starts at 6th Street with a very steep grade (10%) which continues throughout the entire length of the structure. To make the connection to Freeway Drive, a sharp radius horizontal curve (275 feet) is necessary. This steep grade and curve meet the minimum standards for this class of road, but may be hazardous during inclement weather.
- Traffic demand on this new Division Street Overpass structure is expected to be lower than that for the existing overpass. This is partially because the new alignment does not provide a direct connection to the more dense commercial areas along 4th Street and College Way but rather serves the residential population along Division Street.
- Property impacts east of I-5 will be significant. The existing right-of-way along Division Street between the freeway and 6th Street is narrow, which will result in the purchase of some residential properties. Other properties will be impacted by the abutment retaining walls and bridge structure. The abutment walls will be close to the existing houses and rise to heights of about 15 feet. Fourth Street on the south side of Division Street will be closed, which will limit access to property along this section of 4th Street. The alley between 5th and 6th Streets on the north side of Division Street will also be closed at Division Street. At a point near the church, located at the corner of 5th Street and Division Street, the new structure will be high enough to allow cars to pass under. However, the bridge structure will clear the church windows by only a few feet. This may require that the church property be purchased.
- The right-of-way needs in the downtown core will be essentially within existing streets and parking lots. However, one commercial building could be significantly impacted as the new structure curves around it in a semi-circle. This will require significant modifications to the building and vehicle access changes, if the business is to remain. Some street closures will

occur where the bridge approaches the existing grade and impact traffic circulation. The abutment in the downtown area will consist of high retaining walls (19 feet), which will also create a visual impact to this commercial neighborhood.

- The cost of the structure for this Division Street alignment alternative is estimated at approximately $20 million.
- The public comments and ratings at the November 16, 1999 Open House indicated a strong opposition for this alternative with 35 out of the 43 comments or 82 percent were strongly opposed to this alternative with an additional 12 percent somewhat opposed to it.
- Construction of this alternative can proceed without significant disruption to traffic. The Division Street alternative could be built while the existing Second Street Overpass remained operational. Conversely, the Division Street alternative could be built after and in addition to one of the Second Street alignment alternatives.

Summary - The Division Street Overpass Alternative provides an alternative crossing alignment that connects the area east of I-5 with the Mount Vernon downtown area. It could be constructed in lieu of or in concert with the other Second Street replacement alternatives proposed. However, this alternative is dropped from further consideration because of the higher construction cost, significant right-of-way and relocation impacts, less traffic being served and negative public reaction.

PREFERRED SECOND STREET OVERPASS ALTERNATIVE

A **Modified Same Alignment Alternative** is recommended as the preferred alternative for more detailed engineering and environmental analysis. Based on the results of the previous analysis and comments received at the public open house, the Mount Vernon City Council at their April 26, 2000 meeting selected the Modified Same Alignment Alternative as their preferred choice. The project Steering Committee, the Skagit Sub-RTPO Technical Committee and the Skagit Sub-RTPO Policy Board concurred with this recommendation of the Modified Same Alignment Alternative as the preferred alternative.

The **Modified Same Alignment Alternative** was recommended because it requires less new right-of-way, provides a smoother alignment and the closure time of 8 to 12 months was considered reasonable. The **North-side Alignment Alternative** is also recommended for further analysis because it further minimize traffic closure time and provides an alternative if the closure time for the Modified Same Alignment Alternative is substantially increased. The roadway geometry along both of these alignments is acceptable and their capital costs are estimated at approximately $10 million. They also received the highest public ratings during the public Open House.

Recommended elements of the alternatives as described in this pre-design study and the analysis of the I-5 Corridor analysis are discussed below:

- **Roadway Section** - The roadway section for the new Second Street Overpass will consist of three 12-foot lanes, two 6-foot sidewalks and two 5-foot bike lanes. With the steep grade of this overpass, it is anticipated that there will be two lanes for slower uphill traffic and one lane for downhill traffic. However, this 60-foot width will allow some flexibility in the future to reconfigure lanes and sidewalks.
- **Structure Type: -** As previously shown on Exhibit 22, three viable structure types are suitable for the conditions at this site. These types include concrete box girders, prestressed girders and steel girders structural system.

- **Structure / Roadway Profile** - The conceptual profile was designed to provide sufficient vertical clearance over I-5, the BNSF Railroad right-of-way and SR 536. The profile assumes an average 5-foot structure depth and a maximum grade of 8.5 percent to match existing conditions. This profile will raise the Second Street profile at Washington Street in the downtown area, which may require that Washington Street be truncated at Second Street. A general profile for this alternative is displayed in Exhibit 23.
- **Construction Sequencing** - The design and construction of the Second Street Overpass replacement need to consider the future widening of I-5. Although the replacement structure could be built at the same time as the widening of I-5, the freeway widening is a long range plan. It is more likely that the Second Street Overpass replacement will proceed before the freeway widening. In this case, placement of columns to accommodate future widening is important.

  Exhibit 24 illustrates column placement that will allow construction of the new overpass and will accommodate either a six- or eight-lane freeway in the future. It is important to note that this assumes that a new 4-foot column will be located against the existing retaining wall on the east side of I-5 in the shoulder area. This will reduce the existing shoulder width to approximately 4 to 5 feet. A temporary deviation to standards will be needed for the reduced shoulder width until the widened freeway is constructed.
- **Traffic and Transit Re-routing During Construction** – During the construction of the Second Street Overpass replacement, vehicular and transit traffic will need to be re-routed. Several routes are available depending on the direction of travel and one's final destination. Vehicular traffic can use College Way and Cameron Way/Fir Street to access Freeway Drive to enter or exit the downtown core. Also for destinations or origins south of Division Street and east of I-5, vehicular traffic could use Kincaid Street/Broad Street.

  For transit service, buses on Routes 208 and 802 that use the Second Street Overpass could be re-routed along Freeway Drive to Cameron Way for access to the Riverside Transfer Center. If the grade along Cameron Way is too steep, the buses could use College Way to connect to Riverside Drive and proceed to the Transfer Center.

EXHIBIT 23
CONCEPTUAL PROFILE FOR PREFERRED NORTH-SIDE ALIGNMENT FOR NEW SECOND STREET OVERPASS

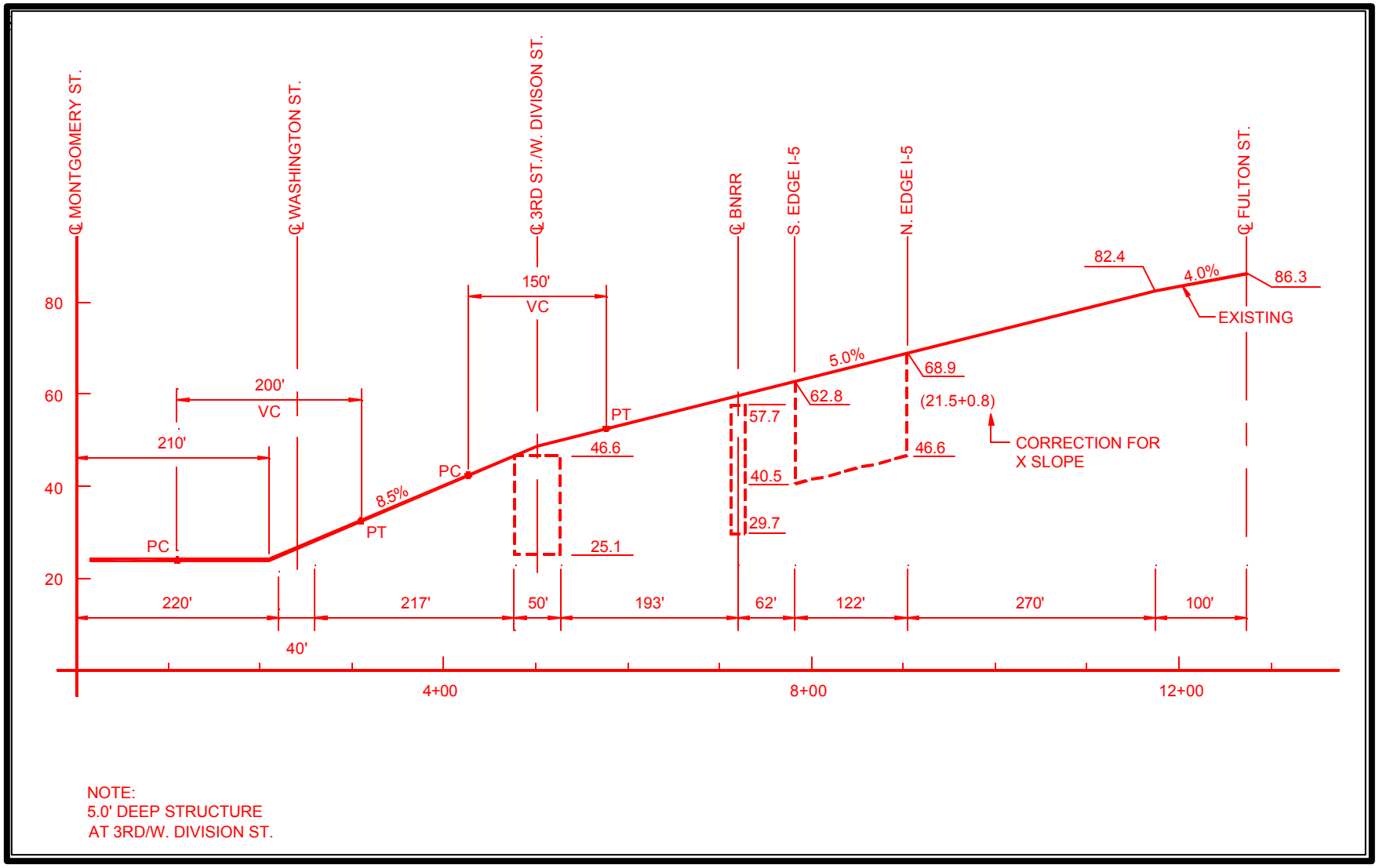
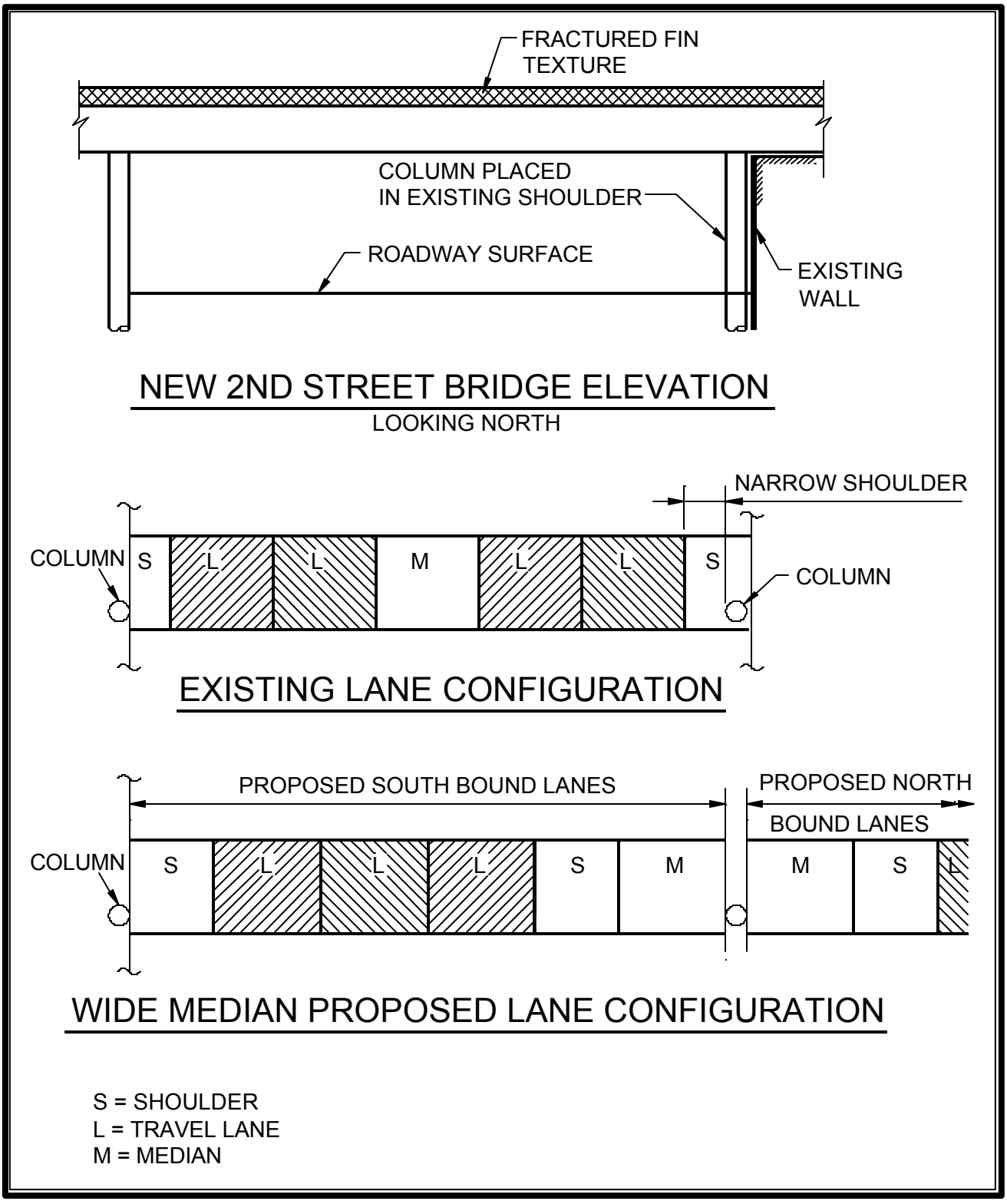


EXHIBIT 24
COLUMN PLACEMENT IMPACTS FOR NEW SECOND STREET OVERPASS BRIDGE



Source: CivilTech Corporation

I-5 EVALUATION METHODOLOGY

The evaluation process of the various corridor alternatives for this I-5 Pre-Design Study will use the "Balance Sheet" evaluation method. This method was selected because it displays data and criteria in the form of a comparative matrix that indicates the relative order of magnitude of the impacts resulting from the alternatives. The "Balance Sheet" method can be used to highlight the key issues of concern relative to various interest groups, can provide information that differentiates one alternative plan from the others, ensure consistency with federal, state and local requirements, and can conform to the requirements of the decision makers.

CRITERIA / MEASURES OF EFFECTIVENESS

A list of evaluation categories with corresponding criteria / measures of effectiveness were developed by WSDOT for similar pre-design and feasibility studies. Input from the general public and local agencies was sought to determine which criteria are most important and meaningful to them and should be used in the I-5 Pre-Design Study to evaluate the various I-5 corridor improvement alternatives. The general public was asked to rank these criteria in the order of their importance at the November 10, 1998 Open House held in Mount Vernon. The Skagit Sub-regional Transportation Planning Organization Technical Advisory Committee members were also asked to rank these criteria.

The various criteria were then analyzed to determine the most useful measures for this pre-design study considering the following information:

- Ranking by the public
- Ranking by the TAC
- Availability of reliable data at this level of analysis
- Relevance to selecting a preferred alternative
- Coverage

This analysis resulted in the selection of 13 criteria or measures of performance in four categories. These criteria are summarized below by evaluation category.

Transportation Performance

The following performance criteria were selected as indicators of degree of transportation impacts related to the build alternatives:

- **Level of Service (LOS)** – This measure is used to determine if the various build alternatives would generally improve or worsen the travel conditions on I-5 and their impact on local roads. The LOS for roadways is a qualitative measure describing the operational conditions within a traffic stream along a section of roadway. It is generally expressed in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience and safety. For roadway sections, these service level categories range from LOS "A" to LOS "F" with LOS "E" being a point where the traffic demand on the roadway is equal to the capacity of the roadway. Currently, WSDOT has set their service objectives at LOS "D" for roadway sections through urban areas and LOS "C" for roadway sections through rural areas.

  For this pre-design study, the following procedure will be used to measure the freeway and local street levels of service:

⇒ **Freeway Segments**: The freeway LOS will be calculated using the planning methods outlined in Chapter 3 of the *1997 Update of Special Report 209, Highway Capacity Manual*.

⇒ **Local Roads**: Since this study is only trying to determine if the travel conditions on local streets will improve or worsen, a modified arterial LOS analysis based on the Florida Department of Transportation (FDOT) planning guidelines is used as well as output from the TMODEL2 travel assignment forecasts. The detailed information needed for the Highway Capacity Manual method is not being developed for the various roadways and intersections along all the local streets as part of this study.

The local roads analyzed as part of this study are:

- SR 11 - Cook Rd. to Burlington Blvd.
- SR 20 - SR 536 through the Burlington CBD
- SR 536 - I-5 to SR 20
- SR 538 - Freeway Dr. to LaVenture Rd.
- George Hopper Rd. - Burlington Blvd. to Bouslag Rd.
- Burlington Blvd. - Skagit River to SR 20
- Riverside Dr./Mt. Vernon Rd. - Cedardale Rd. to Skagit River
- Freeway Dr. - SR 536 to SR 538
- Anderson Rd. - Cedardale Rd. to Mt. Vernon Rd.
- Cedardale Rd. - Stackpole Rd. to Blodgett Rd.
- LaVenture Rd. - Hoag Rd. to Section St.
- Division St. - 6th St. to SR 9
- Kincaid St./Broad St. - I-5 to 15th St.
- Blackburn Rd. - little Mountain Rd. to Mount Vernon Rd.
- Cook Rd. - I-5 to SR 9
- SR 9 - Division St. to SR 20

♦ **System/Intermodal Connectivity** – This measure was selected to determine if the various build alternatives would generally improve or worsen system connectivity by allowing vehicles to proceed to their destinations in a more direct route or take less time. Saving or increases in average trip length in term of miles and/or time will be measured from the traffic modeling effort being done by WSDOT and SCOG.

♦ **Average Travel Time** – The purpose of this measure is to determine if the various build alternatives would generally improve or worsen average travel time by comparing the total vehicle-hour estimates from the traffic modeling effort being done by WSDOT and SCOG.

♦ **Safety (Accidents per MVMT) -** This measure is used to determine if the various build alternatives would generally improve or worsen the safety of the highway system. Total vehicle miles traveled on freeway links and on local highway links will be determined from the traffic modeling effort being done by WSDOT and SCOG. These values will then be multiplied by the average safety factors determined by WSDOT. From these calculations increases or decreases in the overall safety of the system will be measured and compared.

Financial/Economic Performance

The following performance criteria were selected as indicators of degree of financial and economic impacts resulting from the build alternatives:

- **Benefit-to-Cost Ratio (b/c)** –This measure is used to determine the overall financial viability of the various build alternatives. For this pre-design study, a b/c ratio based on annual costs and benefits will be used. Detailed life cycle cost and benefit data is not available in this pre-design study. Only the following annualized factors will be used to estimate the b/c ratio:
  - ⇒ base year construction costs
  - ⇒ average WSDOT highway operating/maintenance costs
  - ⇒ estimated 2020 travel time savings estimated at $10.00 per hour
  - ⇒ estimated 2020 vehicle operating cost savings based on an average operating cost savings of $0.31 per vehicle mile traveled.
- **Capital Costs** - This measure is used as a surrogate to determine the overall financial feasibility of the various build alternatives. For this pre-design study, the base year construction costs, right-of-way and relocation costs, environmental expenses and design costs, as well as administrative costs will be estimated.

Social/Land Use/Economic Development Performance

The social impact category and the land use/economic development impact category were combined into one performance category because of the limited nature of the scope of work for this study. The following performance criteria were selected as indicators of degree of social/land use/economic development impacts associated with the build alternatives:

- **Number of Displaced Businesses** – This measure is used to determine the impact of the various build alternatives on the commercial/retail activity in the study area. For this pre-design study, a rough estimate of the number of businesses impacted by the various alternatives will be counted based on the typical sections, area parcel maps and a field review of the area.
- **Number of Displaced Homes** - This measure is used to determine the impact of the various build alternatives on the residential sections in the study area. For this pre-design study, a rough estimate of the number of houses impacted by the various alternatives will be counted based on the typical sections, parcel maps and a field review of the area.
- **Environmental Justice** – This measure will be a subjective assessment by environmental professionals involved with this study to determine if there is a predominate impact to any distinct, cultural or economic group.

Environmental Impact Performance

The following performance criteria were selected as indicators of degree of environmental impacts related to the build alternatives:

- **Wetlands/Flood Plain** – This measure is used to determine the impact of the various build alternatives on sensitive wetlands in the study area. For this pre-design study, a rough estimate of the number of acres of wetland/flood plain areas impacted by the various alternatives will be counted based on the typical sections and existing wetland mapping.

- **Agriculture/Forest Resources** - This measure is used to determine the impact of the various build alternatives on agriculture resources in the study area. For this pre-design study, a rough estimate of the number of acres of agriculture/forest resource lands impacted by the various alternatives will be counted based on the typical sections and existing land use mapping.
- **General Environmental Impact** – This measure is intended to determine the impact of the various build alternatives on general environmental impacts to the study area. This will be a subjective assessment by environmental professionals considering physical, geotechnical, wildlife, historical, cultural and land use impacts not estimated in the other measures.

Summary

Overall, 13 measures of effectiveness/criteria in four categories have been selected for use in the evaluation process for this pre-design study. Five measures are in the transportation category, two measures are in the financial/economic category, three measures are in the social land use category and three measures are in the environmental category. In general, these measures are useful in differentiating the impacts of the alternatives and address different aspects of the alternatives.

The rating schedule used to indicate the degree of impact each alternative has as compared to the No-Build alternative will be as follows:

- ✻ Significant Improvement
- ✙ Moderate Improvement
- ❍ Little or No Impact or Cost
- ◗ Moderate Impact or Cost
- ● Significant Impact or Cost

I-5 ALTERNATIVES ANAYSIS

Three I-5 Corridor Alternatives were analyzed as part of this Pre-Design Study. These alternatives, as previously described, are:

- Transportation System Management (TSM) / Transportation Demand Management (TDM) Alternative
- Arterial By-Pass Alternative
- I-5 Widening Alternatives

Each of these corridor alternatives were analyzed separately to determine if they fulfilled the purpose and need for the improvement. Various transportation, financial, social/land use and environmental investigations were conducted as part of these analyses. The results of these analyses are summarized below for each alternative.

I-5 TSM/TDM ALTERNATIVE

The primary components that comprise this alternative include:

- Safety and Stopping Sight Distance Improvements along I-5.
- New Park-and Ride Lots near Cook Road, Anderson Road and the proposed Intermodal Station.
- New Transit Service to Bellingham, Everett and Boeing.
- Expanded Transit Service on Parallel Routes to I-5.
- Expanded Intercity Rail Passenger Service.
- Development of New Transportation Demand Management strategies.

Preliminary transportation, financial, social/land use and environmental analyses were conducted to determine the expected level of impacts associated with this alternative. The approach and findings of these analyses are presented below.

Transportation Impacts

To analyze the transportation impacts for this alternative using the SCOG travel demand model, assumptions on the amount of future vehicle trip reductions associated with this alternative were necessary. An assumed two percent reduction in the 2020 vehicle OD trip table for the Mount Vernon/Burlington urban area was made to represent the effect of these TSM/TDM improvements. This percentage increase represents more than a 100 percent increase in transit users from current use. The reduced trip table was then assigned to the future year highway network using the SCOG model. The results of this assignment for the entire region are summarized in Table 4.

As shown on this table, the comparison with the future year No Build Alternatives shows that the TSM/TDM Alternative, if implemented, is expected to result in approximately one percent fewer trips being assigned to the highway network. This reduction in trips would result in about one percent fewer vehicle miles traveled and vehicle hours of travel across the County. The overall average speed on all roadways in the County increased from 23.9 miles per hour to 24.2 miles per hour, while the average trip length increased slightly and the average trip time slightly decreased. In addition, the expected number of accidents was reduced since fewer trips were made on higher accident roadways.

TABLE 4
REGIONAL HIGHWAY TRAVEL CHARACTERISTICS AND FINDINGS
2020 AFTERNOON PEAK HOUR SUMMARY FOR ALL ROADWAYS
TSM / TDM ALTERNATIVE AND NO BUILD COMPARISON

	ALTERNATIVES	
CHARACTERISTICS	**NO BUILD**	**TSM / TDM**
Total Regional Trips Assigned (vehicles)	57,330	56,840
Total Roadway Lane Miles	1,523	1,523
Total Vehicle Miles Traveled	679,230	674,410
Total Vehicle Hours of Travel	28,260	27,900
Average Roadway Speed (mph)	23.9	24.2
Average Freeway Speed (mph)	50.2	50.3
Average Trip Length (miles)	11.8	11.9
Average Trip Time (minutes)	29.6	29.4
Estimated Number of Accidents (annually)	4,810	4,795

Source: WSDOT and H. W. Lochner, Inc.

The I-5 traffic volume results and LOS analysis for the freeway sections for the TSM/TM Alternative are summarized in Table 5. The freeway analysis indicates that the TSM/TDM Alternative provided little improvement for future year traffic conditions on I-5 in 2020, which is the primary objective for these build alternatives.

TABLE 5
I-5 2020 AFTERNOON (PM) PEAK HOUR TRAFFIC VOLUMES AND LEVEL OF SERVICE
TSM / TDM ALTERNATIVE

	TRANSPORTATION SYSTEM MANAGEMENT / TRANSPORTATION DEMAND MANAGEMENT ALTERNATIVE 2020 I-5 TRAFFIC CONDITIONS 4-LANE ROADWAY											
	Southbound						Northbound					
Cross Streets	Peak Hour Volume (vehicles)	Service Flow Rate (pc/hr/ln)	Adjusted Free-Flow Speed (mph)	Average Pass. Car Speed (mph)	Density (pc/mi/ln)	LOS	Peak Hour Volume (vehicles)	Service Flow Rate (pc/hr/ln)	Adjusted Free-Flow Speed (mph)	Average Pass. Car Speed (mph)	Density (pc/mi/ln)	LOS
Cook Rd.	2,771	1,750	65.5	64.3	27.2	D	3,088	1,919	64.0	61.6	31.2	D
SR 11	3,084	1,946	65.5	62.8	31.0	D	3,483	2,164	64.2	57.7	37.5	E
SR 20	3,850	2,429	65.2	48.5	50.1	F	4,134	2,568	64.4	39.8	64.6	F
G. Hopper Rd.	4,424	2,791	65.1	18.1	154.0	F	4,490	2,790	64.6	19.3	144.6	F
College Way	4,045	2,551	64.0	41.2	62.0	F	3,998	2,482	64.8	45.3	54.8	F
Kincaid St.	3,877	2,446	64.3	47.3	51.8	F	3,538	2,196	65.4	58.0	37.9	E
Anderson Rd.	3,260	2,057	64.6	60.4	34.0	E	3,016	1,872	65.5	63.5	29.5	D
Hickox Rd.												

Source: WSDOT and H. W. Lochner, Inc.

As can be seen from a comparison of the WSDOT's service objective of LOS "D" for urban areas and LOS "C" for rural areas with the future 2020 LOS ratings, I-5 will continue to have a serious capacity deficiency even with these TSM and TDM improvements by 2020. The critical congestion point on I-5 remains at the Skagit River Bridge between the College Way Interchange and the George Hopper Road Interchange. The average passenger car speed in this section of roadway is expected to be around 18 to 19 miles per hour and the roadway density would range from about 144 to 154 passenger cars per mile per lane.

The local arterial impacts with the TSM/TDM Alternative are summarized on Table 6 with the No Build traffic conditions. From a comparison of these results, the LOS conditions of the selected arterials show little overall improvement. However, the TSM/TDM does provide the opportunity for some users to select an alternative mode of travel through the future roadway congestion.

Financial/Economic Impacts

As an indicator of the financial and economic performance of the alternative the expected capital costs related to the key components were assessed. This included the construction of the park-and-ride lots and the low-cost, transportation system management improvements, previously described.

The estimated capital cost for this TSM/TDM alternative is approximately $10 million. This includes the construction of three park-and-ride lots, roadway overlays to improve sight distance problems and other miscellaneous interstate safety improvements as well as right-of-way and relocation costs. The costs related to the transit and intercity passenger rail improvements were not available for this study and were not included in this preliminary estimate.

Social/Land Use/Economic Development Impacts

The low cost safety, sight distance and other TSM improvements are not expected to require any additional right-of-way and would not change the current land usage of the area. However, the new park-and-ride lots proposed as part of this alternative will require new right-of-way. The specific sites for these proposed park-and-ride lots have not been selected. The general location for two of the sites, namely the Cook Road/I-5 area and the Anderson Road/I-5 area, are not expected to have any significant impact on residential and commercial property requiring relocations. The proposed park-and-ride lot at the new multi-modal center will be developed as part of that project and its impacts will be assessed when a site is determined.

Environmental Impacts

The low cost safety, sight distance and other minor improvements associated with the TSM/TDM Alternative are not expected to require any additional right-of-way and generally will not increase the amount of impervious area in any significant manner. However, the siting of the proposed park-and-ride lots will cover one to two acres each of new impervious area that will require mitigation treatments and approved drainage. Selection of wetlands and agricultural lands will be avoided, if possible. Consideration to all environmental concerns will be used in the selection of the sites for the proposed park-and-ride facilities.

Summary

The TSM/TDM Alternative, as a stand alone alternative, does not meet the primary objective of this study, which is to improve the mobility on the I-5 corridor through the Mount Vernon/Burlington area. This alternative does improve alternative modes of travel through the congested areas but is not

TABLE 6
SUMMARY OF KEY ARTERIAL TRAFFIC VOLUMES AND LEVEL OF SERVICE DURING AN AVERAGE WEEKDAY PM PEAK HOUR IN 2020 TSM/TDM ALTERNATIVE

No.	Name of Roadway/Arterial	No Build (2020)		TSM/TDM (2020)	
		Critical Vol.	LOS	Critical Vol.	LOS
1	SR 11 (Burlington Blvd. To Josh Wilson Rd.)	746	C	740	C
2	SR 20 (SR 536 through the Gardner Rd.)				
	2a. from SR 536 to Avon Allen Rd.	1734	E	1735	E
	2b. from Avon Allen Rd. to I-5	1825	F	1778	E/F
	2c. from I-5 to Avon Ave.	1757	E	1750	E
	2d. from Avon Ave. to Gardner Rd.	1311	E	1315	E
	2e. from Gardner Rd. to Collins Rd.	1762	F	1748	F
	2f. from Collins Rd. to SR 9	1438	F	1427	F
3	SR 536 (I-5 to SR 20)				
	3a. from I-5 to Skagit River	1187	F	1183	F
	3b. from Skagit River to Avon Allen Rd.	1683	F	1672	F
	3c. from Avon Allen Rd. to SR 20	1525	F	1528	F
4	SR 538 (Freeway Dr. to Laventure Rd.)				
	4a. from Freeway Dr. to Riverside Dr.	1770	F	1741	F
	4b. from Riverside Dr. to Laventure Rd.	1811	E/F	1800	E/F
5	George Hopper Rd. (Riverside Dr. To Bouslog Rd.)	1152	D	1071	D
6	Burlington Blvd. (Skagit River to SR 20)				
	6a. from Skagit River to Pease Rd.	2441	F	2405	F
	6b. from Pease Rd. to SR 20	1467	D	1435	D
	6c. from SR 20 to Avon Rd.	1329	E	1313	E
	6b. from Avon Rd. to Cook Rd.	582	B	574	B
7	Riverside Dr./Mt. Vernon Rd. (Hickox Rd. to Skagit River)				
	7a. from Hickox Rd. to Blackburn Rd.	556	B	535	B
	7b. from Blackburn Rd. to Kincaid St.	914	F	897	E/F
	7c. from Kincaid St. to Fulton St.	1315	F	1296	F
	7d. from Fulton St. to Skagit River	1869	E/F	1833	E/F
8	Freeway Dr. (SR 536 to SR 538)	620	C	608	C
9	Anderson Rd. (Cedardale Rd. to Mt. Vernon Rd.)	934	C	933	C
10	Cedardale Rd. (Stackpole Rd. to Blackburn Rd.)				
	10a. from Stackpole Rd. to Hickox Rd.	229	A	226	A
	10b. from Hickox Rd. to Blackburn Rd.	779	C	768	C
11	Laventure Rd. (Hoag Rd. to Section St.)				
	11a. from Hoag Rd. to Fir St.	601	D	590	D
	11b. from Fir St. to Section St.	756	C	743	C

TABLE 6 Continued
SUMMARY OF KEY ARTERIAL TRAFFIC VOLUMES AND LEVEL OF SERVICE
DURING AN AVERAGE WEEKDAY PM PEAK HOUR IN 2020
TSM/TDM ALTERNATIVE

No.	Name of Roadway/Arterial	No Build (2020)		TSM/TDM (2020)	
		Critical Vol.	LOS	Critical Vol.	LOS
12	Division Street (6th Street to SR 9)				
	12a. from 6th St. to LaVenture Rd.	738	C	731	C
	12b. from LaVenture Rd. to Waugh Rd.	528	B	522	B
	12c. from Waugh Rd. to SR 9	1027	F	1018	F
13	Kincaid Street/Broad Street (I-5 to 15th St.)	1052	C	1040	C
14	Blackburn Rd. (Little Mountain Rd. to Mt. Vernon R	1078	D	1063	C
15	Cook Rd. (I-5 to SR 9)				
	15a. from I-5 to Gardner Rd.	1083	E	1072	E
	15b. from Gardner Rd. to Collins Rd.	1319	F	1302	F
	15c. from Collins Rd. to SR 9.	1062	E	1050	E
16	SR 9 (Division St. to SR 20)				
	16a. from Division St to Gunderson Rd.	1018	E	1022	E
	16b. from Gunderson Rd. to Mud Lake Rd.	766	E	758	E
	16c. from Mud Lake Rd. to South Skagit Hwy.	864	E	854	E

Source: WSDOT and H. W. Lochner, Inc.

expected to reduce the expected congestion levels on I-5. Because of the nature of this alternative, the highway components associated with this alternative are not capital intensive and are not expected to have any significant social and environmental impacts. As a result, these TSM/TDM improvements should be included with any build alternative.

ARTERIAL BY-PASS ALTERNATIVE WITH NEW SKAGIT RIVER BRIDGE

The primary components that comprise this alternative include:

- Widen Anderson Road to 4-lanes between I-5 and LaVenture Road
- Extend LaVenture Road from Anderson Road to Fowler Street – 4-lanes with bike lanes
- Widen LaVenture Road to 4- or 5-lane section from Fowler Street to Hoag Road
- New Roadway Section and Bridge over Skagit River
- New 4-lane Arterial on Widened Levee from Skagit River to SR 20
- Arterial Extensions to New Arterial with George Hopper Road, Pease Road, Section Street, Rio Vista Avenue and Lafayette Road

Preliminary transportation, financial, social/land use and environmental analyses were conducted to determine the expected level of impacts associated with this alternative. The approach and findings of these analyses are presented below.

Transportation Impacts

The transportation impacts for this alternative were forecasted using the travel demand model developed for the adopted 1996 Skagit County Transportation Plan by SCOG. The proposed improvements were added to the future year, adopted highway network that included financially feasible roadway improvements within the county and cities. The TDM and TSM improvements are also included with this alternative. The reduced vehicle trip table that reflects the TDM/TSM improvements was then assigned to the modified highway network using the adopted model. The results of this assignment for the entire region are summarized in Table 7.

TABLE 7
REGIONAL HIGHWAY TRAVEL CHARACTERISTICS AND FINDINGS
2020 AFTERNOON PEAK HOUR SUMMARY FOR ALL ROADWAYS
ARTERIAL BY-PASS ALTERNATIVE AND NO BUILD COMPARISON

	ALTERNATIVES	
CHARACTERISTICS	**NO BUILD**	**ARTERIAL BY-PASS**
Total Regional Trips Assigned (vehicles)	57,330	56,877
Total Roadway Lane Miles	1,523	1,550
Total Vehicle Miles Traveled	679,230	675,000
Total Vehicle Hours of Travel	28,260	26,265
Average Roadway Speed (mph)	23.9	25.7
Average Freeway Speed (mph)	50.2	51.7
Average Trip Length (miles)	11.8	11.9
Average Trip Time (minutes)	29.6	27.7
Estimated Number of Accidents (annually)	4,810	4,805

Source: WSDOT and H. W. Lochner, Inc.

As shown on this table, the comparison with the future year No Build Alternatives shows that the Arterial By-pass Alternative, if implemented, is expected to result in approximately one percent fewer trips being assigned to the highway network. This reduction in trips and added new arterial and bridge crossing of the Skagit River would result in about one percent fewer vehicle miles traveled but a seven percent decrease in vehicle hours of travel across the County.

From this analysis, the overall average speed on all roadways in the County is expected to increase from around 23.9 miles per hour to about 25.7 miles per hour. Likewise, the average trip length is expected to increase slightly while the average trip time is expected to decrease by nearly two minutes. However, the expected number of accidents is only expected to decrease slightly.

The I-5 traffic volume results and LOS analysis for the freeway sections for the Arterial By-Pass Alternative are summarized in Table 8. The freeway analysis indicates that the Arterial By-Pass Alternative provided little improvement for future year traffic conditions in 2020 which is the primary objective for these build alternatives.

TABLE 8
I-5 2020 AFTERNOON (PM) PEAK HOUR TRAFFIC VOLUMES AND LEVEL OF SERVICE ARTERIAL BY-PASS ALTERNATIVE

	ARTERIAL BY-PASS ALTERNATIVE (Anderson Rd./LaVenture Rd./New Bridge over Skagit River/New Arterial to SR 20) 2020 I-5 TRAFFIC CONDITIONS (4-LANE ROADWAY)											
	Southbound						Northbound					
Cross Streets	Peak Hour Volume (vehicles)	Service Flow Rate (pc/hr/ln)	Adjusted Free-Flow Speed (mph)	Average Pass. Car Speed (mph)	Density (pc/mi/ln)	LOS	Peak Hour Volume (vehicles)	Service Flow Rate (pc/hr/ln)	Adjusted Free-Flow Speed (mph)	Average Pass. Car Speed (mph)	Density (pc/mi/ln)	LOS
Cook Rd.	2,769	1,748	65.5	64.3	27.2	D	3,108	1,931	64.2	61.7	31.3	D
SR 11	3,093	1,952	65.5	62.7	31.1	D	3,485	2,165	64.0	57.5	37.7	E
SR 20	3,799	2,397	65.2	50.1	47.8	F	4,129	2,565	64.4	40.0	64.1	F
G. Hopper Rd.	4,347	2,743	65.1	23.6	116.3	F	4,387	2,726	64.6	26.1	104.3	F
College Way	3,966	2,501	64.0	44.2	56.5	F	3,969	2,464	64.8	46.4	53.2	F
Kincaid St.	3,826	2,413	64.3	48.9	49.3	F	3,399	2,110	65.4	60.1	35.1	E
Anderson Rd.	3,377	2,131	64.6	59.0	36.1	E	3,088	1,916	65.5	63.1	30.4	D
Hickox Rd.												

Source: WSDOT and H. W. Lochner, Inc.

As can be seen from a comparison of the WSDOT service objectives of LOS "D" for urban areas and LOS "C" for rural areas with the future 2020 LOS ratings, I-5 will continue to have a serious capacity deficiency even with implementation of the new arterial by-pass and new bridge over the Skagit River by 2020. The critical congestion point on I-5 remains at the Skagit River Bridge between the College Way Interchange and the George Hopper Road Interchange. The average passenger car speed in this section of roadway is expected to increase to around 23 to 26 miles per hour and the roadway density would range from about 104 to 116 passenger cars per mile per lane.

The local arterial LOS impacts with the Arterial By-pass Alternative and new bridge over the Skagit River are summarized on Table 9 with the No Build traffic conditions for comparison. From a comparison of these results, the service conditions of the selected arterials show significant improvement on several local arterials. These arterials include Burlington Boulevard and Riverside Drive near the Skagit River Bridge, as well as George Hopper Road, Anderson Road, Kincaid Street/Broad Street and College Way (SR 538). In many cases, the LOS on these local arterials is raised a whole level/category.

Financial/Economic Impacts

As an indicator of the financial and economic performance of the alternative, the expected capital costs related to the key components were assessed. This included the construction of new roadway sections, widening of Anderson Road and LaVenture Road and the new bridge over the Skagit River, as well as the park-and-ride lots and the low-cost, transportation system management improvements.

TABLE 9
SUMMARY OF KEY ARTERIAL TRAFFIC VOLUMES AND LEVEL OF SERVICE DURING AN AVERAGE WEEKDAY PM PEAK HOUR IN 2020
ARTERIAL BY-PASS ALTERNATIVE

No.	Name of Roadway/Arterial	No Build (2020)		Arterial By-pass (2020)	
		Critical Vol.	LOS	Critical Vol.	LOS
1	SR 11 (Burlington Blvd. To Josh Wilson Rd.)	746	C	726	C
2	SR 20 (SR 536 through the Gardner Rd.)				
	2a. from SR 536 to Avon Allen Rd.	1734	E	1784	F
	2b. from Avon Allen Rd. to I-5	1825	F	1796	F
	2c. from I-5 to Avon Ave.	1757	E	1714	D/E
	2d. from Avon Ave. to Gardner Rd.	1311	E	1139	D
	2e. from Gardner Rd. to Collins Rd.	1762	F	1595	F
	2f. from Collins Rd. to SR 9	1438	F	1433	F
3	SR 536 (I-5 to SR 20)				
	3a. from I-5 to Skagit River	1187	F	1665	F
	3b. from Skagit River to Avon Allen Rd.	1683	F	1651	F
	3c. from Avon Allen Rd. to SR 20	1525	F	1144	F
4	SR 538 (Freeway Dr. to Laventure Rd.)				
	4a. from Freeway Dr. to Riverside Dr.	1770	F	1707	F
	4b. from Riverside Dr. to Laventure Rd.	1811	E/F	1472	D
5	George Hopper Rd. (Riverside Dr. To Bouslog Rd.)	1152	D	995	C/D
6	Burlington Blvd. (Skagit River to SR 20)				
	6a. from Skagit River to Pease Rd.	2441	F	1815	E/F
	6b. from Pease Rd. to SR 20	1467	D	1321	D
	6c. from SR 20 to Avon Rd.	1329	E	1284	D
	6b. from Avon Rd. to Cook Rd.	582	B	544	B
7	Riverside Dr./Mt. Vernon Rd. (Hickox Rd. to Skagit River)				
	7a. from Hickox Rd. to Blackburn Rd.	556	B	389	A
	7b. from Blackburn Rd. to Kincaid St.	914	F	850	E/F
	7c. from Kincaid St. to Fulton St.	1315	F	1221	F
	7d. from Fulton St. to Skagit River	1869	E/F	1722	D/E
8	Freeway Dr. (SR 536 to SR 538)	620	C	614	C
9	Anderson Rd. (Cedardale Rd. to Mt. Vernon Rd.)	934	C	1378	B*
10	Cedardale Rd. (Stackpole Rd. to Blackburn Rd.)				
	10a. from Stackpole Rd. to Hickox Rd.	229	A	237	A
	10b. from Hickox Rd. to Blackburn Rd.	779	C	770	C
11	Laventure Rd. (Hoag Rd. to Section St.)				
	11a. from Hoag Rd. to Fir St.	601	D	1269	D*
	11b. from Fir St. to Section St.	756	C	1315	C*

Notes: * 4-Lane for the "2020 Arterial Bypass" Alternative Only

TABLE 9 Continued
SUMMARY OF KEY ARTERIAL TRAFFIC VOLUMES AND LEVEL OF SERVICE DURING AN AVERAGE WEEKDAY PM PEAK HOUR IN 2020
ARTERIAL BY-PASS ALTERNATIVE

No.	Name of Roadway/Arterial	No Build (2020)		Arterial By-pass (2020)	
		Critical Vol.	LOS	Critical Vol.	LOS
12	Division Street (6th Street to SR 9)				
	12a. from 6th St. to LaVenture Rd.	738	C	738	C
	12b. from LaVenture Rd. to Waugh Rd.	528	B	472	B
	12c. from Waugh Rd. to SR 9	1027	F	967	F
13	Kincaid Street/Broad Street (I-5 to 15th St.)	1052	C	835	B
14	Blackburn Rd. (Little Mountain Rd. to Mt. Vernon R	1078	D	1059	C
15	Cook Rd. (I-5 to SR 9)				
	15a. from I-5 to Gardner Rd.	1083	E	1066	E
	15b. from Gardner Rd. to Collins Rd.	1319	F	1290	F
	15c. from Collins Rd. to SR 9.	1062	E	1053	E
16	SR 9 (Division St. to SR 20)				
	16a. from Division St to Gunderson Rd.	1018	E	1041	E
	16b. from Gunderson Rd. to Mud Lake Rd.	766	E	691	D
	16c. from Mud Lake Rd. to South Skagit Hwy.	864	E	765	E

Source: WSDOT and H. W. Lochner, Inc.

The estimated capital cost for the Arterial By-pass Alternative ranges from approximately $155 to $170 million. The park-and-ride facilities and other low cost, TSM improvements are approximately $10 million. The cost for a new, parallel, Second Street Overpass replacement structure is approximately $10 million. These costs include the construction/widening of the roadway sections and three park-and-ride lots, the replacement of the Second Street Overpass, roadway overlays to improve sight distance problems and other miscellaneous interstate safety improvements as well as right-of-way and relocation costs. The total cost associated with this Arterial By-pass Alternative ranges from $175 to $190 million.

Social/Land Use/Economic Development Impacts

The number of businesses and residences taken as well as land use along the alignments and environment justice issues are indicators of social, land use and economic development impacts. The new roadway and roadway widening sections of the Arterial By-Pass Alternative will require additional right-of-way to implement the improvements. The number of residential and business structures that would have to be moved or eliminated by this alternative could be considerable. There are approximately 250 developed properties along the bypass route. However, it is anticipated that no businesses would be taken as a result of these improvements but approximately 29 to 33 houses may be taken and residents relocated. Most of these properties are in established neighborhoods along LaVenture Street. Other properties along the corridor will also be affected by requiring permanent and/or temporary easements and partial property takes.

In addition, there are also two middle schools, one elementary school, Skagit Valley Community College and two churches along the by-pass route that would be affected by the increased traffic on LaVenture Road.

Other major rights-of-way acquisitions will be required for this alternative. Agricultural land and dike-top properties will probably involve less cost on a per-foot basis, however, it would be anticipated that more total property would be required to establish an entire new road, plus the intersection improvements that would be required.

A listing of the existing land use along the Arterial By-pass alignment and with the various Skagit River crossings is presented below. This listing shows the approximate percentage of land use types encountered along the by-pass alternative and Skagit River crossing routes being considered.

Alternative and Sub-Alternative Routes	LAND USE PERCENTAGES ALONG ROUTE			
	Residential	Agricultural	Commercial	Light Industrial
Arterial Bypass-w/ Western River Crossing	50%	45%	5%	0%
Arterial Bypass-w/ Central River Crossing	55%	40%	5%	0%
Arterial Bypass-w/ Eastern River Crossing	55%	40%	5%	0%

From the analysis for environmental justice issues, there are no apparent impacts on low-income or minority populations. Impacts to residents along this alternative route would not disproportionately affect minority or low-income populations. Businesses along the arterial by-pass alternative route include chain retail operations, such as gas stations and mini-marts, as well as health care, elder and daycare facilities. The diked agricultural areas adjacent to the Skagit River are small farming operations, which may utilize migrant workers on an occasional or seasonal basis. However, none of these operations is likely to be displaced or significantly altered by roadway improvements.

Environmental Impacts

The amount of wetlands and agriculture/forest resources impacted as well as general overall environmental impacts are the indicators used in this study to measure the level of environmental impacts associated with the build alternatives. From the sketch planning approach used in this study, approximately 15 acres of wetlands and about 45 acres of agricultural lands are expected to be impacted by the implementation on the Arterial By-pass Alternative. There will also be a significant habitat disturbance caused by the construction of the new arterial along the existing levee.

Road construction and road widening for this alternative will be required to follow all applicable Best Management Practices and permit conditions at stream crossings to avoid, minimize, or eliminate impacts to the aquatic environment. Impacts of the completed project would also be expected to be minor for this alternative since bridges would not significantly affect fish behavior or habitat. However, there would be significant permit and approval requirements and conditions associated with this alternative because of the presence of listed and candidate species and their habitat. All alternative

river and stream crossings will need to address the potential impacts to fisheries resources in general and ESA listed and candidate species in particular.

Identified archaeological/historical sites along this alternative should be easy to avoid, and so should not be a major consideration in route selection. As with any project of this kind however, normal precautions would be exercised during construction excavation activities to be on the look-out for culturally significant materials. A local archaeologist/historian should conduct periodic inspections and be on-call in the case of suspected resource encounters.

This arterial bypass route impacts more wetlands than the I-5 Widening Alternative. It would directly or indirectly affect approximately 15 acres of wetlands. Additional right-of-way will be required to mitigate these impacts. In addition, this route would be more disruptive to wildlife use of the area. Wildlife currently experiences very little if any disruption from north-south vehicular movements in the area. Species of concern in the area are more likely to be encountered along the routes of this alternative.

The Everson Deposit soils in the south half of the alignment typically present no significant hazards to future roadway development, and are expected to provide satisfactory foundations for roadways and structures. The soils are not susceptible to liquefaction during seismic activity, and have no history of landslide activity. However, the narrow zone of Older Undifferentiated material along the bluff overlooking the Skagit River have been known to exhibit shallow landslide activity. This steeply sloping area must therefore be considered a potential landslide hazard.

The character of alluvial floodplain soils in the north half of the alignment was assessed by means of the published geologic data and boring logs from previous projects in the vicinity. The soils in this area are primarily granular in nature (sand or silty sand), and may be loose in the upper 50 to 60 feet. These granular soils are considered to be prone to liquefaction during seismic shaking. The profile often includes soft silts or clays and zones of organic matter that may be prone to consolidation under highway embankment static loads. The seismic liquefaction could result in settlement or stability failures of highway embankments, or large deformations from the "lateral spread" phenomenon that could occur along the banks of the Skagit River. Deep foundation support at the bridge locations must be designed to prevent settlement of the static loads from the bridge structure, and to resist lateral loads imposed by ground shaking and lateral spread.

Summary

The Arterial By-pass Alternative with the TSM/TDM improvements does not meet the primary objective of this study, which is to improve the mobility on the I-5 corridor through the Mount Vernon/Burlington area. The service levels along a major portion of I-5 through the study area will remain at or over the capacity of the existing interstate roadway. This alternative does improve travel conditions on local roadways, especially at the Burlington Boulevard/Riverside Drive Bridge over the Skagit River and other existing arterials. However, it does have significant social and environmental impacts by affecting more than 30 residences, affecting about 15 acres of wetlands, requiring about 45 acres of agricultural lands and causing significant wildlife habitat impacts.

Since this alternative does not meet the primary objective of this analysis, it will not be further evaluated. However, local area planners should consider all or portions of this alternative, especially new Skagit River Bridge crossing, in developing and updating their comprehensive transportation plans for the area and region.

I-5 WIDENING ALTERNATIVES

Two roadway-widening options are considered for this alternative. These options are:

Option 1: Widen I-5 from 4 to 6-lanes with a Narrow Median to minimize right-of-way needs

Option 2: Widen I-5 from 4 to 6-lanes with Wide Median to allow for future lanes

Common elements that are contained in each option include:

- Add Missing Northbound On-Ramp Southbound Off-Ramp at Hickox Road
- Construct a New 4-lane Blackburn Overpass
- Construct a New I-5 Structure for Widened 6-lane Kincaid Street
- Construct a New 3-lane Second Street Overpass
- Widen and Lengthen the I-5 Structure for Widened 6-lane College Way
- Widen and Lengthen the I-5 Structure for Widened SR 20
- Construct a New 4-lane Cook Road Overpass
- Redesign Freeway Ramps, as necessary

For analysis purposes, the I-5 Widening (Narrow Median) Alternative option assumes a maximum of 6-lanes; while the I-5 Widening (Wide Median) Alternative option assumes extra lanes are constructed in the median for a total of 8-lanes.

Preliminary transportation, financial, social/land use and environmental analyses were conducted to determine the expected level of impacts associated with this alternative. The approach and findings of these analyses are presented below.

Transportation Impacts

The transportation impacts associated with this alternative were also forecasted using the travel demand model developed for the adopted 1996 Skagit County Transportation Plan by SCOG. The proposed improvements for each widening option were added to the future year, adopted highway network that included financially feasible roadway improvements within the county and cities. The TSM and TDM improvements, previously described, are also included with this alternative. The reduced vehicle trip table that reflects the TSM/TDM improvements was then assigned to the modified highway network with I-5 widened to 6-lanes and 8-lanes using the adopted model. The results of these assignments for the entire region are summarized in Table 10.

As shown on this table, the comparison of the I-5 Widening Alternatives with the future year No Build Alternative shows that the I-5 Widening Alternatives, if implemented, are expected to result in approximately one percent fewer trips being assigned to the overall highway network. This reduction in vehicle trips and added freeway lanes would result in about one percent fewer vehicle miles traveled but an 8 to 9 percent decrease in vehicle hours of travel across the County for a 6-lane (narrow median) and 8-lane (wide median) freeway options, respectively.

The overall average speed on all roadways in the County increased from 23.9 miles per hour to about 26.1 miles per hour for the 6-lane freeway option and 26.5 miles per hour for the Widen Median option after the eight lanes are constructed. The overall roadway speeds include average freeway speed increases from 50.3 miles per hour for the No Build Alternative to 59.5 miles per hour for the narrow median option with 6-lanes and 62.8 miles per hour with the wide median option after the eight lanes are constructed.

TABLE 10
REGIONAL HIGHWAY TRAVEL CHARACTERISTICS AND FINDINGS
2020 AFTERNOON PEAK HOUR SUMMARY FOR ALL ROADWAYS
I-5 WIDENING ALTERNATIVES AND NO BUILD COMPARISON

	ALTERNATIVES		
CHARACTERISTICS	**NO BUILD**	**I-5 Widen 6-Lanes (Narrow Median)**	**I-5 Widen 8-Lanes (Wide Median)**
Total Regional Trips Assigned (vehicles)	57,330	56,860	56,860
Total Roadway Lane Miles	1,523	1,543	1,558
Total Vehicle Miles Traveled	679,230	677,765	678,490
Total Vehicle Hours of Travel	28,260	25,995	25,610
Average Roadway Speed (mph)	23.9	26.1	26.5
Average Freeway Speed (mph)	50.2	59.5	62.8
Average Trip Length (miles)	11.8	11.9	11.9
Average Trip Time (minutes)	29.6	27.4	27.0
Estimated Number of Accidents (annually)	4,810	4,790	4,790

Source: WSDOT and H. W. Lochner, Inc.

The average trip length is expected to increase slightly, however, the average trip time is expected to decrease by over two minutes. In addition, the expected number of accidents was reduced since fewer trips were made on higher accident roadways.

The I-5 traffic volume results from the assignment forecasts and LOS analysis of the freeway sections for I-5 Widening Narrow Median and Wide Median Alternatives are summarized in Tables 11 and 12. The freeway analysis indicates that the I-5 Widening with Narrow Median Alternative with 6-lanes would significantly improve mobility along I-5, however, it would not meet the WSDOT service objectives LOS "D" for urban areas and LOS "C" for rural areas in 2020. Extensive congestion would continue over the Skagit River Bridge where travel demand is expected to approach or equal the capacity of these freeway sections.

The average passenger car speed in this section of I-5 during the afternoon peak hour with this I-5 Widening Narrow Median Alternative is expected to range from about 54.5 miles per hour to a speed of approximately 67 miles per hour. As with LOS analysis, the slowest section of I-5 would be over the Skagit River Bridge where the speeds would average less than 60 miles per hour and the roadway density would range from about 39 to 42.5 passenger cars per mile per lane. These speeds and density increases are significant improvements over the No Build Alternative with no freeway widening.

The freeway analysis displayed in Table 12 indicates that the I-5 Widening with Wide Median Alternative would significantly improve mobility along I-5, after the eight lanes are constructed. This alternative with eight lanes would meet the WSDOT's service objectives of LOS "D" for urban areas and LOS "C" for rural areas in 2020. This alternative with eight lanes would also allow about 15 percent additional capacity over the Skagit River Bridge for future traffic growth before the service objectives are exceeded.

TABLE 11
I-5 2020 AFTERNOON (PM) PEAK HOUR TRAFFIC VOLUMES AND LEVEL OF SERVICE
I-5 WIDENING (6-Lanes with Narrow Median) ALTERNATIVE

	I-5 WIDENING 6-LANE (Narrow Median) ALTERNATIVE											
	Year 2020 I-5 Southbound						Year 2020 I-5 Northbound					
Cross Streets	Peak Hour Volume (vehicles)	Service Flow Rate (pc/hr/ln)	Adjusted Free-Flow Speed (mph)	Average Pass. Car Speed (mph)	Density (pc/mi/ln)	LOS	Peak Hour Volume (vehicles)	Service Flow Rate (pc/hr/ln)	Adjusted Free-Flow Speed (mph)	Average Pass. Car Speed (mph)	Density (pc/mi/ln)	LOS
Cook Rd.	2,951	1,242	67.0	67.0	18.5	C	3,324	1,377	65.7	65.7	21.0	C
SR 11	3,275	1,378	67.0	67.0	20.6	C	3,795	1,572	65.5	64.8	24.3	D
SR 20	4,446	1,870	66.7	64.2	29.1	D	4,928	2,041	65.9	61.7	33.1	E
G. Hopper Rd.	5,330	2,242	66.6	57.3	39.1	E	5,587	2,314	66.1	54.5	42.5	E
College Way	4,582	1,926	65.5	63.0	30.6	D	4,474	1,852	66.3	64.1	28.9	D
Kincaid St.	4,176	1,757	65.8	64.4	27.3	D	3,680	1,523	66.9	66.0	23.1	C
Anderson Rd.	3,685	1,550	66.1	65.3	23.7	C	3,131	1,295	67.0	67.0	19.3	C
Hickox Rd.												

Source: WSDOT and H. W. Lochner, Inc.

TABLE 12
I-5 2020 AFTERNOON (PM) PEAK HOUR TRAFFIC VOLUMES AND LEVEL OF SERVICE
I-5 WIDENING (Wide Median with 8-Lanes Analysis) ALTERNATIVE

	I-5 WIDENING (Wide Median) ALTERNATIVE (Forecasts & Analysis Asumes 8-Lanes)											
	Year 2020 I-5 Southbound						Year 2020 I-5 Northbound					
Cross Streets	Peak Hour Volume (vehicles)	Service Flow Rate (pc/hr/ln)	Adjusted Free-Flow Speed (mph)	Average Pass. Car Speed (mph)	Density (pc/mi/ln)	LOS	Peak Hour Volume (vehicles)	Service Flow Rate (pc/hr/ln)	Adjusted Free-Flow Speed (mph)	Average Pass. Car Speed (mph)	Density (pc/mi/ln)	LOS
Cook Rd.	2,957	934	68.5	68.5	13.6	B	3,408	1,058	67.2	67.2	15.7	B
SR 11	3,292	1,038	68.5	68.5	15.2	B	3,936	1,222	67.0	67.0	18.2	C
SR 20	4,495	1,418	68.2	67.3	21.1	C	5,109	1,587	67.4	66.2	24.0	C
G. Hopper Rd.	5,389	1,700	68.1	66.3	25.6	D	5,736	1,782	67.6	65.5	27.2	D
College Way	4,616	1,456	67.0	66.2	22.0	C	4,556	1,415	67.8	66.9	21.1	C
Kincaid St.	4,247	1,340	67.3	67.3	19.9	C	3,754	1,165	68.4	68.4	17.0	C
Anderson Rd.	3,788	1,195	67.6	67.6	17.7	C	3,221	999	68.5	68.5	14.6	B
Hickox Rd.												

Source: WSDOT and H. W. Lochner, Inc.

The average passenger car speed in all sections of I-5 in the study area during the afternoon peak hour with this I-5 Widening Wide Median Alternative is expected to be over 65 miles per hour with 8-lanes constructed. This alternative with eight lanes would increase mobility in the study area as well as for regional traffic passing through this section of I-5.

The local arterial LOS impacts with the I-5 Widening Alternatives are summarized on Table 13 with the No Build traffic conditions for comparison.

TABLE 13
SUMMARY OF KEY ARTERIAL TRAFFIC VOLUMES AND LEVEL OF SERVICE DURING AN AVERAGE WEEKDAY PM PEAK HOUR IN 2020
I-5 WIDENING ALTERNATIVES

No.	Name of Roadway/Arterial	No Build (2020)		I-5 Widening (2020) Narrow Median (6-Lanes)		I-5 Widening (2020) Wide Median (8-Lanes Assumes)	
		Critical Vol.	LOS	Critical Vol.	LOS	Critical Vol.	LOS
1	SR 11 (Burlington Blvd. To Josh Wilson Rd.)	746	C	835	C	836	C
2	SR 20 (SR 536 through the Gardner Rd.)						
	2a. from SR 536 to Avon Allen Rd.	1734	E	1910	F	1917	F
	2b. from Avon Allen Rd. to I-5	1825	F	1982	F	2010	F
	2c. from I-5 to Avon Ave.	1757	E	1971	F	1987	F
	2d. from Avon Ave. to Gardner Rd.	1311	E	1244	D	1223	D
	2e. from Gardner Rd. to Collins Rd.	1762	F	1716	F	1712	F
	2f. from Collins Rd. to SR 9	1438	F	1407	F	1547	F
3	SR 536 (I-5 to SR 20)						
	3a. from I-5 to Skagit River	1187	F	1805	F	1831	F
	3b. from Skagit River to Avon Allen Rd.	1683	F	1642	F	1637	F
	3c. from Avon Allen Rd. to SR 20	1525	F	1075	F	1073	F
4	SR 538 (Freeway Dr. to Laventure Rd.)						
	4a. from Freeway Dr. to Riverside Dr.	1770	F	1905	F	1981	F
	4b. from Riverside Dr. to Laventure Rd.	1811	E/F	1801	E/F	1791	E/F
5	George Hopper Rd. (Riverside Dr. To Bouslog Rd.)	1152	D	1140	D	1155	D
6	Burlington Blvd. (Skagit River to SR 20)						
	6a. from Skagit River to Pease Rd.	2441	F	1903	F	1888	F
	6b. from Pease Rd. to SR 20	1467	D	1181	C	1184	C
	6c. from SR 20 to Avon Rd.	1329	E	1161	D	1141	D
	6b. from Avon Rd. to Cook Rd.	582	B	522	B	519	B
7	Riverside Dr./Mt. Vernon Rd. (Hickox Rd. to Skagit River)						
	7a. from Hickox Rd. to Blackburn Rd.	556	B	410	A	397	A
	7b. from Blackburn Rd. to Kincaid St.	914	F	882	E/F	879	E/F
	7c. from Kincaid St. to Fulton St.	1315	F	1127	F	1102	F
	7d. from Fulton St. to Skagit River	1869	E/F	1649	D	1626	D
8	Freeway Dr. (SR 536 to SR 538)	620	C	588	C	583	C
9	Anderson Rd. (Cedardale Rd. to Mt. Vernon Rd.)	934	C	931	C	927	C
10	Cedardale Rd. (Stackpole Rd. to Blackburn Rd.)						
	10a. from Stackpole Rd. to Hickox Rd.	229	A	237	A	235	A
	10b. from Hickox Rd. to Blackburn Rd.	779	C	694	B	692	B
11	Laventure Rd. (Hoag Rd. to Section St.)						
	11a. from Hoag Rd. to Fir St.	601	D	581	D	566	D
	11b. from Fir St. to Section St.	756	C	750	C	748	C

TABLE 13 Continued
SUMMARY OF KEY ARTERIAL TRAFFIC VOLUMES AND LEVEL OF SERVICE
DURING AN AVERAGE WEEKDAY PM PEAK HOUR IN 2020
I-5 WIDENING ALTERNATIVES

No.	Name of Roadway/Arterial	No Build (2020)		I-5 Widening (2020) Narrow Median (6-Lanes)		I-5 Widening (2020) Wide Median (8-Lanes Assumes)	
		Critical Vol.	LOS	Critical Vol.	LOS	Critical Vol.	LOS
12	Division Street (6th Street to SR 9)						
	12a. from 6th St. to LaVenture Rd.	738	C	723	C	732	C
	12b. from LaVenture Rd. to Waugh Rd.	528	B	534	B	532	B
	12c. from Waugh Rd. to SR 9	1027	F	1004	F	1005	F
13	Kincaid Street/Broad Street (I-5 to 15th St.)	1052	C	1072	C	1090	C
14	Blackburn Rd. (Little Mountain Rd. to Mt. Vernon Rd.)	1078	D	1094	D	1083	D
15	Cook Rd. (I-5 to SR 9)						
	15a. from I-5 to Gardner Rd.	1083	E	1156	E	1176	E
	15b. from Gardner Rd. to Collins Rd.	1319	F	1355	F	1367	F
	15c. from Collins Rd. to SR 9.	1062	E	1090	E	1100	E
16	SR 9 (Division St. to SR 20)						
	16a. from Division St to Gunderson Rd.	1018	E	1014	E	1005	E
	16b. from Gunderson Rd. to Mud Lake Rd.	766	E	734	E	726	E
	16c. from Mud Lake Rd. to South Skagit Hwy.	864	E	797	E	787	E

Source: WSDOT and H. W. Lochner, Inc.

From a comparison of these results, the service conditions along the selected arterials show mixed results. For parallel arterials, such as Burlington Boulevard, Riverside Drive and others, arterial traffic volumes are expected to be reduced and arterial service levels are improved for both I-5 Widening Options. However, for arterials with access to I-5, volumes are expected to increase and service levels will remain the same or worsen. In many cases as SR 20, SR 536 and SR 538 (College Way), the service levels near I-5 access points already are expected to be at LOS "F" under No Build conditions and will continue at this service rating with these I-5 Widening Alternatives. In comparing the Narrow Median with 6 lanes and the Wide Median with 8 lanes options, there is little expected change in traffic volumes with no additional changes in the LOS on the key arterials.

Financial/Economic Impacts

As an indicator of the financial and economic performance of the alternative, the expected capital costs related to the key components were assessed. This included the construction of new freeway lanes, bridges, interchanges, drainage system and the new bridge over the Skagit River, as well as the park-and-ride lots and the low-cost, transportation system management improvements. Anticipated right-of-way and relocation costs were also estimated and included for these alternative options. All costs are in 1999 dollars for comparison purposes.

The estimated capital cost for the I-5 Widening Alternative with Narrow Median option ranges from approximately $145 to $175 million. The park-and-ride facilities are estimated at approximately $5 million. The cost for a new, parallel, Second Street Overpass replacement structure is approximately $10 million. The total cost associated with this I-5 Widening Alternative with Narrow Median option ranges from $160 to $190 million or $18 to $21.4 million per mile of freeway widening.

The estimated capital cost for the I-5 Widening Alternative with Wide Median option with 6 lanes ranges from approximately $200 to $235 million. The park-and-ride facilities are estimated at approximately $5 million. The cost for a new, parallel, Second Street Overpass replacement structure is approximately $10 million. The total cost associated with this I-5 Widening Alternative with Narrow Median option and 6 lanes ranges from $215 to $250 million or $24.2 to $28.2 million per mile of freeway widening. The additional cost to add the extra two lanes in the median and provide a total of 8 lanes is estimated at $25 to $30 million.

A preliminary benefit to cost (b/c) ratio analysis, developed on an annual basis, was also performed for the I-5 Widening Alternatives since they meet the primary objective of this study to improved mobility along I-5 in the study area. The results of this preliminary b/c ratio analysis are presented below.

	I-5 Widening–Narrow Median (6-Lanes)		**I-5 Widening–Wide Median (6-Lanes)**		**I-5 Widening–Wide Median (8-Lanes)**	
	Low Range	High Range	Low Range	High Range	Low Range	High Range
Capital Cost (millions)	$160	$190	$215	$250	$240	$280
Annualized Capital Costs (millions)	$11.8	$14.0	$15.8	$18.4	$17.7	$20.6
Annual I-5 O&M Cost (millions)	$ 0.2	$ 0.2	$ 0.2	$ 0.2	$ 0.3	$ 0.3
Annual Travel Time Cost Savings (millions)	$25.8	$25.8	$25.8	$25.8	$30.2	$30.2
Annual Vehicle Operating Cost Savings (millions)	$ 2.1	$ 2.1	$ 2.1	$ 2.1	$ 1.1	$ 1.1
Benefit to Cost Ratio	2.3	2.0	1.7	1.5	1.7	1.5

Source: H. W. Lochner, Inc.

This preliminary b/c ratio analysis on an annual basis uses the following cost and benefit factors:

- Annualized construction costs / right-of-way costs
- Average annual highway operating/maintenance costs for I-5 in study area
- Annual regional travel time savings over the No-Build Alternative
- Annual regional vehicle operating cost savings over the No-Build Alternative.

As can be seen from this preliminary b/c ratio analysis, each of the I-5 Widening Alternative options have a sufficient b/c ratio greater than 1 and are candidates for implementation. The b/c ratio for the I-5 Widening Alternative with 6 lanes and a Narrow Median is higher on an annual basis based on 2020 travel time savings. However, it does not have any reserve capacity for increased travel demand in future years that could slow freeway speeds and reduce future travel time savings. For a true life cycle benefit/cost analysis, these reduced savings would result in a lower b/c ratio.

For the I-5 Widening Alternative with a Wide Median Option and widened to 8 lanes, increased travel time savings offset the increase in capital and maintenance costs. This results in the about the same benefit to cost ratio as with only 6 lanes. However, this alternative does have reserve capacity when widened to 8 lanes that will maintain its travel time savings longer than the narrow median option. In a true life cycle benefit/cost analysis, these continued travel time savings would maintain its b/c ratio while the ratio decreases for the narrow median option.

Social/Land Use/Economic Development Impacts

The land use impacts, number of businesses and residences taken or impacted as well as environment justice are indicators of social, land use and economic development impacts used in this pre-design study. A listing of the existing land use along the I-5 Widening Alternative options is presented below. This summary shows the approximate percentage of land use types encountered along the routes being considered.

Alternative and Sub-Alternative Routes	LAND USE ALONG EACH ROUTE (Approximate Percentage of Route)			
	Residential	Agricultural	Commercial	Light Industrial
I-5 Widening Alternatives (Narrow Median)	40%	15%	40%	5%
I-5 Widening Alternatives (Wide Median)	40%	15%	40%	5%

The number of residential and business structures that would have to be moved or eliminated by the alternative I-5 widening options could be considerable. An estimate of the number of residences and businesses that are likely to be taken by the two widening alternatives are shown below.

Most of these properties are in established neighborhoods in Mount Vernon. Commercial and industrial properties along I-5 will likely be the most expensive in terms of per-foot frontage costs. Other properties along the corridor will also be affected by requiring permanent and/or temporary easements and partial property takes.

Alternative and Sub-Alternative Routes	APPROXIMATE NUMBERS OF PROPERTIES LIKELY TO BE TAKEN ALONG I-5			
	Residential	Business	Other	Parcels Impacted
I-5 Widening Alternatives (Narrow Median)	14	3	0	55
I-5 Widening Alternatives (Wide Median)	23	4	1 (Church)	64

From the analysis for environmental justice, impacts to residents along this alternative route would not disproportionately affect minority or low-income populations. There is no evidence, from field surveys of the areas potentially affected by future road improvements, that there is a predominance of any low-income or minority populations that would be affected.

All residential areas along prospective routes are middle class in character. Resident populations include blue collar and professional working families. Although some minority home-owners would be affected by this alternative, the majority of the impacts would be non-minority residents.

Businesses along the I-5 corridor include various retail operations, restaurants, and a landscape/nursery operation. From a field review of the businesses, there is no evidence of a predominance of minority ownership or minority employment associated with these operations. As a result of this analysis, there are no apparent major environmental justice impacts that would be caused by the I-5 widening alternatives.

Environmental Impacts

The amount of wetlands and agriculture/forest resources impacted as well as general overall environmental impacts are the indicators used in this study to measure the level of environmental impacts associated with the I-5 Widening Alternatives. From the sketch planning approach used in this study, less than two acres of wetlands and less than 5 acres of agricultural lands are expected to be impacted by the implementation of the I-5 Widening (Narrow Median) Alternative. For the I-5 Widening (Wide Median) Alternative less than two acres of wetlands and less than 10 acres of agricultural lands are expected to be impacted. The wetlands that occur along this corridor are relatively small and isolated. However, wetland delineations would need to be conducted to accurately assess total acres of impact. Wildlife species in the area can be expected to experience very little impact from the widening of I-5 since they are already adapted to the disruption and noise associated with interstate operations.

Special consideration will need to be given to areas along the Skagit River, Gage Slough, Joe Leary Slough and Martha Creek for impacts to wetlands, wildlife and habituate areas. Further study is required to verify the degree of environmental impacts to these areas.

Construction activities related to any stream and river crossing in the area will likely be minor, since the timing of construction would be dictated by permit restrictions to times of the year when anadromous species are not utilizing the area.

The County's Shoreline Master Program (SMP) regulates development within 200 feet of the shoreline of the Skagit River. The proximity of the floodplain boundary to I-5 effectively extends this shoreline boundary (and jurisdiction) accordingly. Any project-related work along the I-5 corridor will necessitate administrative review with regard to the local SMP.

Road construction and road widening for this alternative will be required to follow all applicable SMPs and permit conditions at stream crossings to avoid, minimize, or eliminate impacts to the aquatic environment. Impacts of the completed project would also be expected to be minor for this alternative since bridges would not significantly affect fish behavior or habitat. However, there would be significant permit and approval requirements and conditions associated with this alternative because of the presence of listed and candidate species and their habitat. All alternative river and stream crossings will need to address the potential impacts to fisheries resources in general and ESA listed and candidate species in particular.

The regulatory/permit process will likely be protracted. The proposed new I-5 bridge over the Skagit River would necessitate informal consultation with the National Marine Fisheries Service (NMFS). This would occur concurrently with the State Hydraulic Project Approval (HPA) procurement process, which addresses potential impacts to fishery resources of the State.

There appears to be very little evidence of historic or archaeological resources along the I-5 corridor. Much of the area along the route is already developed and most of the widening activities would be

located within the existing right-of-way where filling and grading activities already occurred as part of the initial development of I-5.

Much of the southern half of the existing I-5 roadway lies along the border between competent glacial (Advance Outwash and Vashon Till) and marine terrace (Everson) soils on the east side and potentially soft and liquefiable alluvial soils on the west side. In the northern half of the alignment and at the very southern end are the alluvial soils that encompass the roadway embankments and the Skagit River bridge.

In the southern portion, the slopes in the glacial soils along the east side exceed 40 percent inclination, and must be considered a landslide hazard for static and seismic conditions. Further excavation of slopes along the east side, and re-construction of the existing retaining structures there, is technically possible without loss of support for buildings near the right-of-way; however, the time and cost of this approach could be substantial. Soils along the west side may be liquefiable in some areas, particularly where the highway passes closest to the river. Widening on the west side would require substantial fill embankments that could be constructed by Mechanically Stabilized Earth (MSE) wall or slope methods in order to reduce the footprint of the embankment. In some locations the embankments will be required on both sides of the highway. The new embankments will cause ground settlements that could affect existing nearby buildings, bridges, roadways and utilities.

Soils in the north half of the I-5 alignment are the same floodplain alluvial deposits that are described above for the north half for the Arterial By-pass Alternative. These soils represent a seismic hazard due to the potential for liquefaction, accompanied by settlement and lateral spread. Static loads from embankments will cause long term consolidation settlements.

Summary

The I-5 Widening Alternative with the Wide Median and the TSM/TDM improvements meets the primary objective of this study, which is to improve the mobility on the I-5 corridor through the Mount Vernon/Burlington area. The service levels along a major portion of I-5 through the study area are expected to be at LOS "D" or better with eight travel lanes on I-5 in 2020. The estimated cost of the 6-lane I-5 with a Wide Median is approximately $215 to $250 million. The approximate cost to add the 7^{th} and 8^{th} lanes to this alternative is about $25 to 30 million.

This alternative also has reserve capacity when widened to eight lanes that will maintain its travel time savings over future years. The preliminary b/c ratio on an annual basis at 1.5 to 1.7 is greater than minimum and has the potential to maintain this cost-effectiveness rating based on a true life cycle benefit/cost analysis because of its continued travel time savings potential.

The I-5 Widening Alternative with a Narrow Median also does improve the service levels on I-5 but some sections of I-5 are expected to operate at LOS "E" in 2020. The estimated cost of the 6-lane I-5 with a Narrow Median is approximately $160 to $190 million. This alternative does have a higher preliminary b/c ratio on an annual basis but does not have the reserve capacity to maintain this benefit over a long period time which would result in a lower cost-effectiveness rating based on a true life cycle benefit/cost analysis.

Both of these alternatives do require significant right-of-way through the city of Mount Vernon and would have significant affect on 14 to 23 residences and some businesses. They also have some wetland and minor agricultural impacts.

PUBLIC INVOLVEMENT PROCESS

The development of this communication plan for the I-5 Pre-Design Study between Anderson Road and Cook Road in Skagit County is based on significant public and agency involvement. The results of the key person interviews conducted in September 1998, and from discussions with WSDOT representatives and local agencies were used in the formulation and development of this communication plan. During the key person interviews, community members and local officials indicated the most effective means of informing agencies and the public on the project. In response to their comments, it was determined that project information would be provided through several sources, including newsletter mailings to those on the project mailing list, press releases to local newspapers, as well as paid advertisements to notify the public of open houses.

The following sections briefly describe the purpose of this communication plan, the communication strategies that will be used in this study and a preliminary schedule of communication activities.

PURPOSE OF THE PUBLIC INVOLVEMENT PROGRAM

The public involvement program will assist WSDOT and local agencies in involving and informing the public and elected officials about the study in order to select the best alternative with minimum adverse impacts to the area.

The program objectives are:

- Identify desired participants and stakeholders
- Identify special areas of concern
- Assess and identify the best means for informing the public about the project
- Provide opportunity for input from community residents, businesses, and elected officials

COMMUNICATION STRATEGIES

Several communication and public involvement strategies will be used during this study to inform the public and agencies about the status of the project, identify areas of concern and solicit public comments and opinions. These strategies are summarized below.

Stakeholder Analysis

Four interviews of key persons in the Mount Vernon and Burlington communities, as identified by WSDOT and the cities of Mount Vernon and Burlington, were conducted to identify issues and concerns as related to this study, as well as communication strategies for the study.

Informational Program

The following informational programs were used to distribute project information to agencies and the public during this study:

- **Mailing List** - A mailing list of all interested parties, affected residents, property owners, businesses, public officials, and appropriate agencies has been maintained in a database and used for newsletter and other mailings.
- **Newsletters** - Two newsletters were developed and distributed to announce scheduled public meetings and to inform the community on the status of the project. Newsletters were mailed to

all individuals and agencies on the project mailing list, as well as distributed at city and county offices, and at open houses.

- **Press Releases** - Press releases were prepared and circulated to local media, including the *Skagit Valley Herald, The Argus*, local radio stations and appropriate agencies during key points in the project.
- **Handouts and Comment Forms** - Handouts and comment forms were prepared as needed for open houses.
- **Display Boards** - Display boards and graphics were prepared to present the alternatives, analyses and findings of the study to the public at the open houses and at agency meetings.
- **Web Page** - WSDOT posted information on their web page about the study.
- **Advertisements** - Paid advertisements for public meetings were placed in local newspapers.

Agency and Community Meetings

A series of open house and agency meetings were held to inform the public and appropriate agencies at key milestones of the project. These meetings included:

- **Agency Scoping Meetings** - Project scoping presentations were made to the Mount Vernon and Burlington City Councils and the Skagit County Board of Commissioners to inform them about the purpose and scope of the I-5 Pre-Design Study.
- **Initial Open House** - An initial public meeting was held at the Skagit County Administration Building in Mount Vernon to present preliminary concepts and options to the communities of Mount Vernon and Burlington.
- **Second Open House** - An open house was held at the Mount Vernon Police Department at the conclusion of the pre-design phase to present the results of the evaluation of concepts.

INITIAL OPEN HOUSE RESULTS

An initial open house for the I-5 Pre-Design Study was held on November 10, 1998 from 5:00 to 8:00 p.m. at the Skagit County Administration Building in Mount Vernon. The open house was advertised through the project newsletter and also through a paid advertisement placed in the local newspaper, the *Skagit Valley Herald*. Approximately 55 people attended the open house.

The objective of the open house was to inform the community that WSDOT is looking at alternatives to improving mobility in the Mount Vernon/Burlington areas along the I-5 corridor, to improve the Second Street Overpass, and to gather comments on the possible alternatives. Citizens were invited to review the displays and ask questions of the project team. They also were asked to record their comments and concerns on the forms provided, by responding to proposed alternatives or suggesting others.

A total of 23 comment forms were received either at the open house or mailed in at a later date. In addition to the open house comment forms, responses were also gathered from the project newsletter.

The following sections will summarize the public comments received concerning the I-5 Corridor Alternatives and the Second Street Overpass Alternatives, as well as other comments received at the open house.

I-5 Corridor Alternatives Summary

The following possible I-5 Corridor Alternatives were presented:

1. Combine bus transit improvements, intercity rail improvements, Transportation System Management (TSM) and Transportation Demand Management (TDM) strategies
2. Widen I-5 from four lanes to six lanes with the possibility of future HOV lanes
3. Construct a bypass around the urban area, east or west of I-5.
4. Improve arterial streets parallel to I-5 and construct a new bridge over the Skagit River.

The following is a summary of the primary concerns expressed by those present at the November 10, 1998 Open House and from other comments received from the general public, other suggested alternatives and a ranking of the alternatives based on comments received about the I-5 Corridor Alternatives.

Primary Concerns - In response to improvements to the I-5 corridor, the public comments were mixed. The majority of comments were split nearly equally between those who favored making transit/TSM/TDM improvements and those who favored widening the highway. Some people expressed that they would like to see more transit, park & ride connections, and pedestrian and bicycle improvements instead of widening the freeway. Others felt that widening the freeway was a necessary alternative.

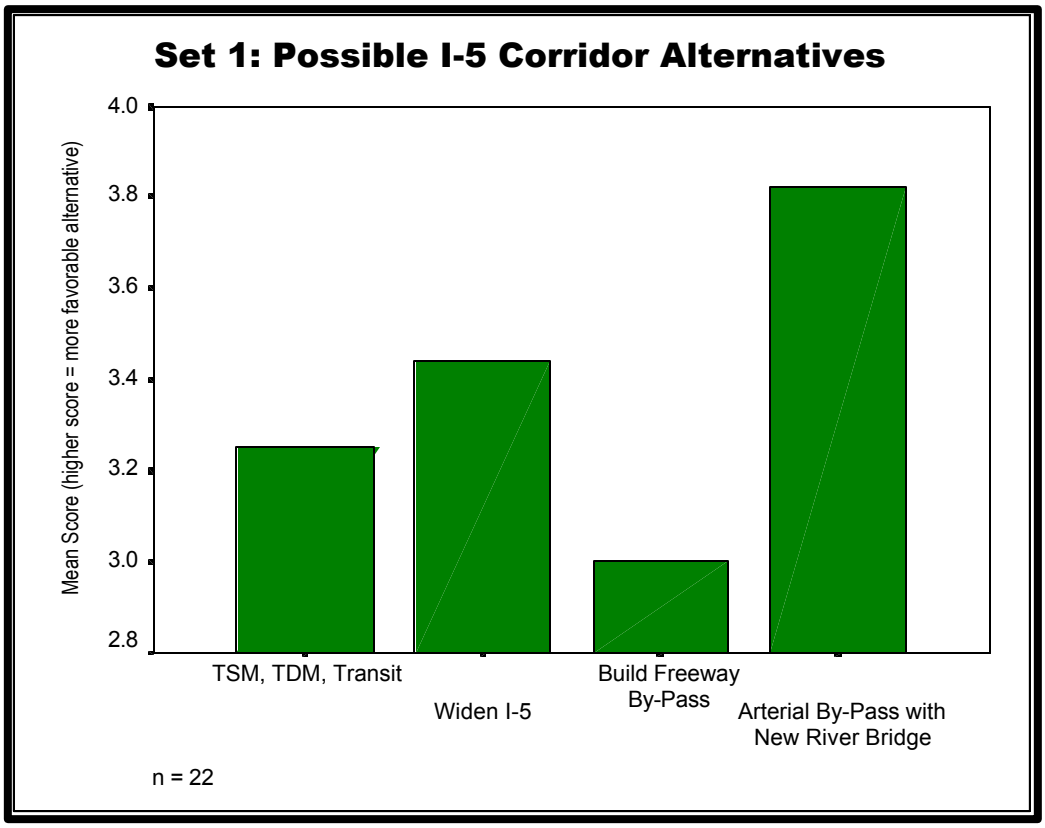
In addition to their preferred alternative, a majority of the respondents favored making improvements to arterial streets parallel to I-5 and/or constructing a new bridge over the Skagit River. Some who favored this alternative saw it as a necessary step in addition to one of the other alternatives listed, and some saw it as a sole solution to mobility problems. There was a significant interest in exploring other alternatives to widening I-5 that would increase mobility for Mount Vernon and Burlington residents and provide options for local residents to travel locally without using the freeway. Some respondents gave specific suggestions of options they would like to see explored, that were not listed among the alternatives given at the open house.

The least popular alternative was constructing a freeway bypass around the Mount Vernon area. This alternative was specifically opposed by several of the respondents and noted as a least favorite alternative by many. The reasons for the opposition to this alternative was losing the land associated with the construction of a new road, and encouraging urban sprawl.

Other concerns/alternative suggestions included:

- Several people commented that they would like to see double-decking the freeway through Mount Vernon considered as an option.
- There were several suggestions regarding ways to increase mobility using existing arterial streets. Also some people mentioned that a new bridge is needed over the Skagit River.
- Some comments indicated that there is an interest in exploring the use of SR 9 as a route to absorb more of the traffic congestion.
- Several people expressed that they favored emphasis on alternatives modes of transportation including improvements to SKAT, improved connections with park & ride lots, new rail options, bicycle and pedestrian improvements.

Public Ranking of the I-5 Corridor Alternatives - I-5 Corridor Alternative ranking forms were distributed to the public at the November 10, 1998 Open House. The participants were asked to rank each of the suggested alternatives. The results of this ranking are presented below.



Based on a review on the ranking of the alternatives by the general public, improved parallel arterials with a new Skagit River bridge alternative scored the most points with an average score of approximately 3.8 points. The I-5 widening alternatives received the second highest point total with an average score of approximately 3.5 points. The freeway by-pass alternative received the lowest point total with an average score of approximately 3.0 points.

Second Street Overpass Alternatives Summary

The following possible Second Street Overpass Alternatives were presented:

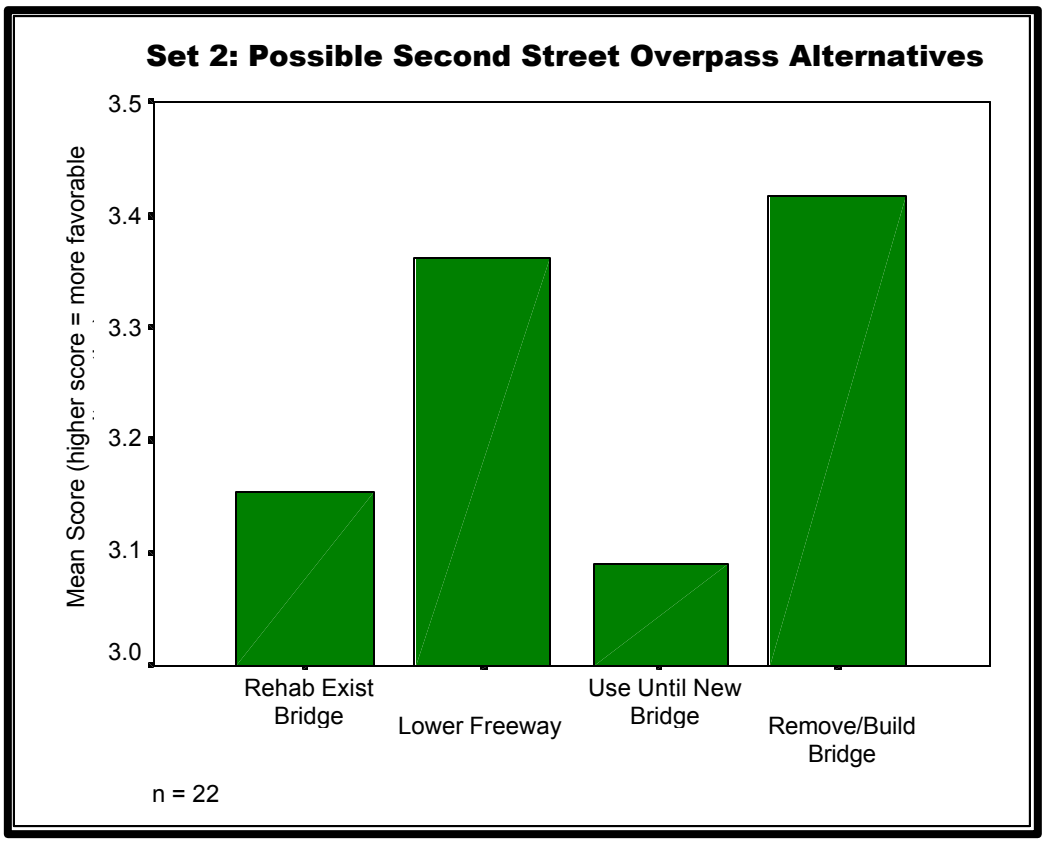
1. Rehabilitate the existing bridge to current standards and seismic requirements.
2. Lower the freeway grade under the bridge to increase clearance over I-5.
3. Construct a new bridge over I-5 parallel to the existing overpass, leaving the old bridge in place until the new one is constructed.
4. Remove the old bridge and replace with a new bridge in the same location.

The following is a summary of the primary concerns expressed by those present at the November 10, 1998 Open House and from other comments received from the general public, other suggested alternatives and the ranking of the alternatives based on comments received about the Second Street Overpass Alternatives.

Primary Concerns - In response to the possible Second Street Overpass alternatives, the lowering of the freeway option and the removal the old bridge to build a new one in its place option received the most favorable comments. Although the alternative to lower the freeway received a high number of favorable comments, some people specifically commented that they were opposed to it. Seven people responded that they would like to see another alternative, other than those presented on the comment form.

Many people also favored pedestrian and bicycle access as part of improvements to the Second St. Overpass.

Public's Ranking of the Second Street Overpass Alternatives - Second Street Overpass ranking forms were distributed to the public at the November 10, 1998 Open House. The participants were asked to rank each of the suggested alternatives. The results of this ranking are presented below.



Based on a review of the alternatives ranking by the general public, the alternative that removed the existing overpass and built a new bridge in its place received an average score of slightly over 3.4 point. The alternative that lowered the freeway grade to improve clearance alternative received an average score slightly under 3 pointy. The building of a parallel bridge and using the existing bridge alternative receives a lower score average of approximately 3.1 points.

SECOND OPEN HOUSE RESULTS

A second open house for the I-5 Pre-Design Study was held on November 16, 1999 at the Mount Vernon Police Department, with 101 people filling out the sign-in log. The meeting was held in an

open house format with no formal presentation. At the second open house, graphics and charts were displayed that illustrated the various alternatives investigated, key project findings and evaluation summaries for both the I-5 Corridor alternatives and the Second Street Overpass alternatives. After reviewing the information provided at the open house, the attendees were asked to fill out a comment form to provide public input on the results of the analyses for both I-5 Corridor alternatives and Second Street Overpass alternatives. A total of 53 comment forms were gathered, however, no all alternatives were rated on all comment forms. All comments are transcribed verbatim in the appendix and summarized below in this report.

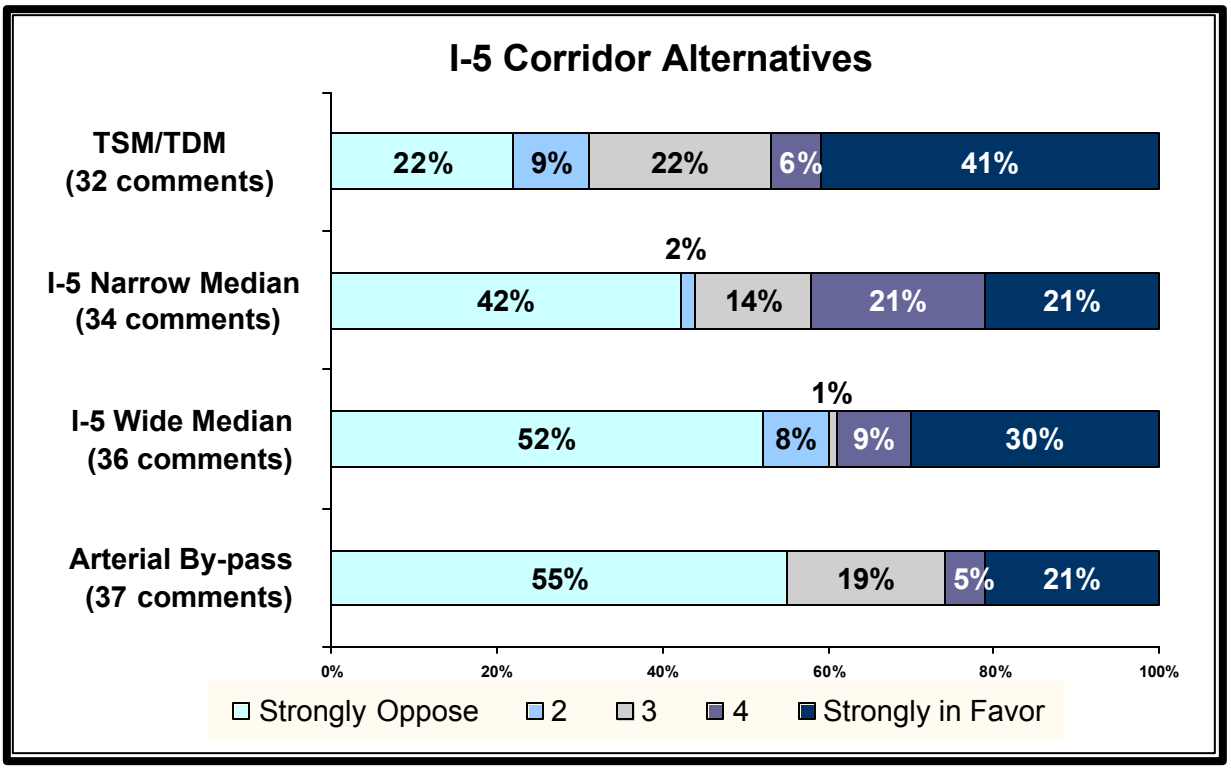
The purpose of the I-5 pre-design study was to provide an analysis for Washington State Department of Transportation (WSDOT) on alternatives for improvements to I-5 through the Mount Vernon and Burlington areas, and improvements to the Second Street Overpass in Mount Vernon which no longer meets regulation standards. The pre-design study examined feasible alternatives and strategies for increasing mobility on I-5 in the project vicinity and bringing the Second Street Overpass up to regulation standards. The alternatives analyzed in the study were:

- **I-5 CORRIDOR OPTIONS**
  - ⇒ **TSM/TDM** –considers several multi-modal transportation strategies, to expand transit services and make low-cost safety and design improvements to I-5.
  - ⇒ **Arterial By-pass** – uses Anderson Road and LaVenture Road, to build a new structure over the Skagit River and a new road along the existing levee extending to SR 20.
  - ⇒ **I-5 Widening/Narrow Median**– would widen to six lanes, with a narrow median area to meet minimum standards.
  - ⇒ **I-5 Widening/Wide Median** – would widen to six lanes, with a wide median area to allow space for future travel lanes.
- **SECOND STREET OVERPASS OPTIONS**
  - ⇒ **Same Alignment** – construct a new bridge to accommodate future widening of I-5; overpass traffic would be detoured for about 16 - 18 months, during demolition and construction.
  - ⇒ **South-Side Alignment** – build a replacement bridge adjacent to and south of the existing structure; traffic can be maintained for most of construction time.
  - ⇒ **North-Side Alignment**– build a replacement bridge adjacent to and north of the existing structure; traffic can be maintained for most of construction time.
  - ⇒ **Division Street Alignment** – extend Division Street across I-5 and the railroad track and curve back to intersect with Freeway Drive; Second Street Overpass will not need to close.

Summary of Comments

The following summary was tabulated from a total of 53 comment forms received from the second pre-design open house held on November 16, 1999 by the WSDOT. It is important to note that all of the comment forms were not completely filled out as some people only rated certain alternatives and not others. This report also does not include additional comments gathered at a separate public meeting conducted by the City of Mount Vernon on November 9, 1999. However, the comments received at that public meeting were similar to the ones expressed at this open house.

I-5 Corridor Alternatives - A graphical summary of the comments and rating for the I-5 alternatives is shown below:



The TSM/TDM alternative received a total of 41% (13 out of 32 comments) indicating they strongly favor that alternative. Many said they would like to see TSM/TDM measures as a solution, or incorporated as part of a solution. (This response coincides with the results of focused interviews of key persons conducted at the onset of the project.) Several people indicated that this option alone would not solve the problem but that they would have liked to see it also incorporated into other options as an alternative.

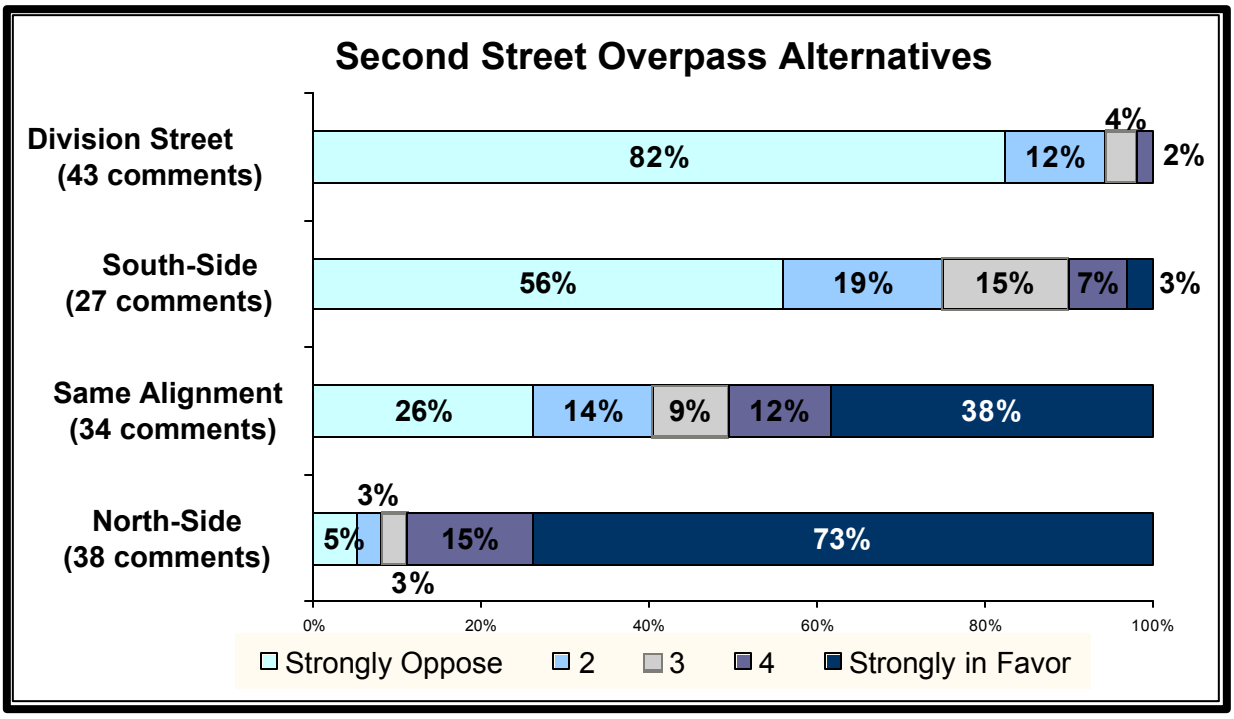
The arterial by-pass alternative received a mostly negative response with 55% (or 20 out of 37 comments) indicating that they are strongly opposed to it, while others indicated that they saw it as a reasonable solution.

The I-5 widening options also received mixed responses. For the I-5 wide median option, 19 out of the 36 comments or 52% of respondents were strongly opposed to it while 10 out of 36 comments or 30% were strongly in favor of it and three others were somewhat in favor of it. For the I-5 narrow median option, 14 out of the 34 comments or 42% of respondents were strongly opposed to it while 7 out of 34 comments or 21% were somewhat in favor and 21% were strongly in favor of it.

Some people expressed that they didn't see a great need for widening I-5, but recognized that there was a clear need to improve mobility for Mount Vernon residents to travel around the city, particularly in an east/west direction. Others stated that access problems and heavy traffic on arterial streets were cited as creating mobility difficulties for residents. These problems are not directly part of this study but should be investigated as part of the cities and county's comprehensive transportation plans. A few

people expressed that there are other options they would like to see studied and were not included in this analysis. Some of these other options were eliminated earlier in the study process. This study analyzed only the alternatives described in this report and approved by the study's Steering Committee.

Second Street Overpass Alternatives - A graphical summary of the comments and rating for the Second Street Overpass alternatives is shown below:



There was a great deal of controversy generated by the new Division Street bridge alternative suggested by the City of Mount Vernon, and incorporated into the alternatives analysis for the project. A number of people from the Division Street neighborhood indicated that they came to the meeting specifically to oppose the alternative. It was viewed as too expensive, unnecessary, and would create a greater impact than the other bridge alternatives analyzed. A total of 82% (35 out of 43 comments) were strongly opposed to the Division St. alternative when they gave it a numerical rating, with another 12% indicating they were somewhat opposed.

The north-side bridge option was the most favored of the Second Street alternatives presented, with 73% or 28 out of 38 comments indicating they were strongly in favor and 15% or 6 out of 38 comments were somewhat in favor of that alternative.

EVALUATION OF I-5 CORRIDOR ALTERNATIVES

The results of the I-5 corridor analysis process and the comments received throughout the public involvement program were used to evaluate the I-5 Corridor Alternatives and select a preferred strategy for improving mobility along I-5 in the Mount Vernon / Burlington area. This information is summarized in a "Balance Sheet" evaluation matrix that was selected as the evaluation process for the I-5 Pre-Design Study. This method was selected because it displays data and criteria in the form of a comparative matrix that indicates the relative order of magnitude of the impacts resulting from the alternatives. This method can highlight the key issues of concern relative to various interest groups and can provide information that differentiates one alternative plan from the others.

Four evaluation categories with corresponding criteria / measures of effectiveness were developed with input from WSDOT, local agencies and the general public at the initial open house in November 1998. A total of 13 measures of effectiveness/criteria in four categories have been selected. In general, these measures are useful in differentiating the impacts of the alternatives and address different aspects of the alternatives. The rating schedule, used in this evaluation to indicate the degree of impact each alternative has as compared to the No-Build Alternative, is as follows:

- ✚ Significant Improvement
- ✻ Moderate Improvement
- ❍ Little or No Impact or Cost
- ◗ Moderate Impact or Cost
- ● Significant Impact or Cost

EVALUATION FINDINGS

The results of the analysis and evaluation process are summarized in Table 14.

TABLE 14
EVALUATION MATRIX FOR I-5 CORRIDOR ALTERNATIVES

CATEGORIES	MEASURES OF EFFECTIVENESS	ALTERNATIVES			
		TSM / TDM	Arterial By-Pass	I-5 Widening Options	
				Narrow Median 6-Lanes on I-5	Wide Median 6/8-Lanes on I-5
Transportation	Freeway Level of Service (Primary Study Objective) Critical Link over Skagit River	❍ LOS "F"	❍ LOS "F"	✻ LOS "E"	✚ LOS "E/D"
	Arterial Level of Service	❍	✻	✻	✻
	System Connectivity	❍	✻	✻	✻
	Average Travel Time	❍	❍ / ✻	✻	✻
	Safety	✻	❍ / ✻	✻	✻
Financial/Economic	Benefit-to-Cost Ratio	NA	NA	✻	✻
	Total Capital Cost	◗	●	●	●
Social/Land Use	No. of Displaced Homes	❍	●	◗	●
	No. of Displaced Businesses	❍	❍	❍	◗
	Environmental Justice	❍	❍	❍	❍
Environmental	Wetland/Flood Plain	❍	◗	❍	❍
	Agriculture/Forest Resources	❍	●	❍	❍
	General Environmental Impact	❍	●	◗	◗

From the review of this evaluation matrix and previous analyses, the following conclusions and findings were determined:

- I-5 Widening Alternatives
  - ⇒ Both I-5 Widening Alternatives show a significant potential for improving mobility along I-5 in the Mount Vernon/Burlington area, based on the results of the I-5 Corridor Alternatives Analysis, previously presented.
  - ⇒ Overall, only the I-5 Widening Alternative with a Wide Median Option to allow for the construction of eight travel lanes has sufficient capacity to accommodate expected traffic demands through 2020. The I-5 Widening Alternative with a Narrow Median Option significantly improves the service levels on I-5 over the expected No Build conditions but is not expected to meet the service objectives of LOS "D" established by WSDOT for urban areas between College Way and SR 20 by 2020.
  - ⇒ The I-5 Widening with a Wide Median Option is expected to impact more homes and some businesses in the Mount Vernon area and have more habitat impacts along the Skagit River and slough crossing along I-5 than the I-5 Widening with a Narrow Median Option but less impacts than the Arterial By-Pass Alternative.
  - ⇒ The I-5 Widening Alternative with a Wide Median Option received the second highest support from the public while the Arterial By-pass Alternative received the lowest amount of support and the highest opposition.
- TSM/TDM Alternative
  - ⇒ In general, the TSM/TDM Alternative is not expected to improve the travel conditions along I-5 through the study area. It will have minimal environmental, social and land use impacts. The costs of the roadway and parking lot improvements are modest but do not include costs associated with intercity passenger rail, transit improvements and travel demand management incentives. However, this alternative does improve alternative modes of travel through the congested areas.
  - ⇒ Because of the nature of the TSM/TDM Alternative, the highway components associated with this alternative are not capital intensive and do not have extensive rights-of-way needs, except for the park-and-ride lot expansion element and are not expected to have any significant social and environmental impacts.
  - ⇒ From a review of the comments received at the second public open house held in November 1999, the TSM/TDM Alternative received the most public support. However, several of the comments recognized that this alternative by itself could not provide the necessary mobility improvement to the study area but did improve alternative modes of travel. Some also suggested that this alternative should be incorporated in any build alternative selected to improve I-5.
  - ⇒ Since the TSM/TDM Alternative, as a stand alone option, does not meet the primary objective of this study, which is to improve the mobility on the I-5 corridor through the Mount Vernon/Burlington area, but does improve alternative modes of travel, the TSM/TDM improvements should be included as part of the preferred alternative(s).
- Arterial By-pass Alternative
  - ⇒ The Arterial By-pass Alternative does not meet the primary objective of this study since a major portion of I-5 is expected to remain at or over the capacity.

- ⇒ As compared to the I-5 Widening Alternatives, the Arterial By-pass Alternative will directly affect fewer businesses along its route, however it will affect more houses, wetlands and agricultural lands and will have more serious environmental impacts.
- ⇒ This alternative does improve travel conditions on local roadways, especially at the Burlington Boulevard/Riverside Drive Bridge over the Skagit River and other existing arterials.
- ⇒ The cost of this alternative is approximately equal to the I-5 Widening Alternative with a Narrow Median Option.
- ⇒ This alternative received the lowest amount of public support and had the highest public opposition.
- ⇒ Since this alternative does not meet the primary objective of this analysis and has serious environmental, land use and social impacts, it should not be carried further for more detailed evaluation. However, because of the improvement to overall local traffic conditions in the study area, local area planners should consider all or portions of this alternative, especially a new Skagit River Bridge crossing, in developing and updating their comprehensive transportation plans for the area and region.

PREFERRED ALTERNATIVE

Based on the I-5 Alternatives Analysis conducted as part of this study, the project Steering Committee determined that additional detailed traffic, geometric, environmental and right-of-way studies need to be completed before they could recommend a long range improvement plan for the overall I-5 corridor through Central Skagit County.

Based on the information available, only the I-5 Widening Alternative with a Wide Median Option to allow sufficient space for eight travel lanes on I-5 met the primary objective of this study. However, more analysis of the detailed traffic and environmental impacts are needed before this alternative can be recommended. As a result, the project Steering Committee was not able at this time to select the most promising alternative to improve the long-range mobility along the I-5 corridor through the Mount Vernon/Burlington area.

For the Second Street Overpass Design, the project Steering Committee concurred with the recommendation by the Mount Vernon City Council that the new Second Street Overpass structure should be design to allow the reconstruction of I-5 as a six-lane facility with a wide median. This recommendation will provide sufficient space in the median to add two additional lanes for future use without necessary reconstruction of the new Second Street Overpass. These considerations will require the new Second Street Overpass to clear span the existing four lane I-5 roadway section to allow sufficient space to construct the I-5 corridor improvements.

It was recommended by the project Steering Committee that any selected I-5 mobility alternative incorporate the appropriate TSM/TDM improvements into it.

LOCAL AGENCIES' RECOMMENDATIONS

The key findings of the I-5 Pre-Design Study from Anderson Road to Cook Road were formally presented to the Mount Vernon City Council, the Skagit Sub-RTPO Technical Committee and the Skagit Sub-RTPO Policy Board. Summaries of these meeting and their recommendations are presented below.

On April 26, 2000, an overall summary of the study purpose and objectives, study process and key findings were presented to the Mount Vernon City Council. Following the presentation, the council members discussed project issues and unanimously voted to accept the motion that the existing Second Street Overpass should be replaced with a new structure following the **Modified Same Alignment Alternative**. They also voted to accept the widening of I-5 to 6-lanes with a wide median under the Second Street Overpass.

On May 10, 2000, a technical summary of the study purpose and objectives, study process, analysis results and key findings were presented to the Skagit Sub-RTPO Technical Committee. Following the presentation and their discussion of the project issues, the technical committee concurred with the Mount Vernon City Council and recommended the **Modified Same Alignment** option as the preferred alternative to replace the existing Second Street Overpass. They also concurred with the decision to design the new Second Street Overpass with sufficient horizontal clearance to accommodate the widening of I-5 to 6-lanes with a wide median for future lanes. However, based on the sketch planning-level analysis of the I-5 Alternatives conducted in this study, the Technical Committee concurred with the project Steering Committee that additional detailed studies were need before they could recommend a long range improvement strategy for the overall I-5 corridor through Central Skagit County.

On May 17, 2000, an overall summary of the study purpose and objectives, study process and key findings were presented to the Skagit Sub-RTPO Policy Board at their May 17, 2000 meeting. Following the presentation and their discussion of the project issues, the Policy Board passed the following two motions:

- **Motion 1**: A motion to recommend that the Policy Board approve the conclusion of the Mount Vernon City Council to move forward to design of the Second Street Overpass with the Modified Existing Alignment Alternative with the I-5 six lane wide-median option for viaduct design purposes from the I-5 Pre-Design Study and the addition of the North Alignment Alternative for further analysis purposes.
- **Motion 2**: A motion recommending that the Policy Board approve the Steering Committee's findings on the I-5 Pre-Design Study with the findings being that the I-5 corridor needs to be studied in greater detail to determine the appropriate mobility solution(s) and ultimate design configuration.

Both motions were seconded and passed unanimously.

PROJECT NEXT STEPS

There are several steps that are needed to implement the recommendations contained in this report. The key elements that are needed to advance the preferred Second Street Overpass Replacement and the I-5 Corridor Improvements are summarized below.

SECOND STREET OVERPASS REPLACEMENT

The process for the development of the new Second Street Overpass structure can move much faster than the capacity and mobility improvements for the overall I-5 corridor through the Mount Vernon / Burlington area because some design and right-of-way funds are available. As part of the next steps in the implementation of the new Second Street Overpass structure, several tasks need to be accomplished to finalize the recommendations of this report. These tasks include the development of a design file and environmental documents, as well as additional public and agency participation. These elements are described below.

Design File Development

For the design file, additional surveying and base mapping needs to be completed to accurately locate all physical features, elevations, and right-of-way boundaries in the study area. With this baseline data, preliminary design options can be further developed for the north-side alignment alternative and the existing alignment alternative. In addition, staged construction options that are partially set outside the existing alignment and partially within it can be analyzed. These designs will help finalize the geometric alignment details, define the right-of-way requirements, finalize the type of structure, and identify design foundation elements.

Geotechnical investigations, as well as hydraulic and drainage investigations need to be performed to prepare preliminary foundation design recommendations and establish drainage requirements. The preliminary design of the structure will also define column locations and sizes, structure depth, roadway profile and right-of-way requirements.

Environmental Documentation

For the environmental assessment, the scope and type of environmental documentation needs to be determined and conducted to meet federal and state requirements. A review of project impacts for endangered species compliance and preparation of a biological assessment are also required. Permitting requirements will also need to be determined in this stage of design.

Community and Agency Involvement

Agency and public participation will play a key role throughout the development of the design and documents, as well as in the selection of the final alignment and the development of the final design and PS&E plans. An overall public involvement plan and agency coordination program needs to be developed for use throughout the design and environmental process, as just as importantly, through construction of the new overpass.

I-5 CORRIDOR IMPROVEMENTS

In light of the Project Steering Committee, the Skagit Sub-RTPO Technical Committee and the Skagit Sub-RTPO Policy Board, the next steps in solving the mobility problems along the I-5 corridor in Central Skagit County is to conduct follow-up detailed engineering, traffic, right-of-way and environmental studies. These studies would be used to select a preferred alternative/strategy, with

sufficient accuracy, to identify which parcels of land need to be preserved from more intense development. Following these studies would be the development of a design file and environmental documents to establish the design requirements, develop right-of-way plans, and identify mitigation requirements.

In light of current economic conditions and budgetary constraints, it is recognized that no funding will be available in the near future to implement any substantial I-5 widening improvements. However, over the next 20 years, land use is expected to intensify in the region, particularly along the I-5 corridor. To preserve the flexibility in identifying economical solutions and the potential to implement any improvement, local governments will need to make key land use decisions. To assist in making these decisions, additional information is needed and detailed engineering and environmental studies need to be performed. Specific study elements, needed to identify a preferred alternative and provide information to decision makers, include:

- Conceptual I-5 roadway and structure plans to identify right-of-way and construction limits
- Interchange concepts, design requirements and right-of-way impacts
- Sufficient environmental analysis to assure the viability of specific recommendations and identify mitigation requirement that affect right-of-way needs.
- Sufficient traffic modeling and analysis for interchange and ramp configurations to identify right-of-way needs.

WSDOT can use this information to provide a framework for their future transportation system through Central Skagit County. Local agencies can used this information to support their regional and local transportation and land use plans. By working together, WSDOT, and regional and local agencies can develop an overall transportation program that will support and sustain economic growth and quality of life in the Central Skagit County.

Public participation will also play a key role throughout the development of these concepts and in the selection of the final alignment. An overall public involvement plan and agency coordination program needs to be developed.

Funding Considerations

A look at WSDOT's *State Highway System Plan, 1999 to 2018* shows that the I-5 widening is planned but is currently shown as "Excluded from Constrained Plan." The result of this designation is that even if WSDOT receives increased funding for the $18 billion "constrained plan", no funding would be programmed for widening this section of I-5.

The next question is "if this widening is not in the 'constrained plan,' why develop a design that accommodates it?" The primary answer is that the *State Highway System Plan* shows that this widening is needed, even if current funding falls short. Furthermore, the Transportation Commission and Legislative leadership have fully endorsed corridor planning and funding for these improvements. As WSDOT's *State Highway System Plan* is updated over the next year (2000-01), significant emphasis will be placed on corridors. This I-5 widening project could at some point move towards the constrained portion of WSDOT's *State Highway System Plan* if WSDOT, the Skagit/Island RTPO and local agencies work together to develop strong regional and statewide support for these improvements.

One other element that could affect the relative priority of this work is the WSDOT plan to change from "Level of Service" to "Travel Delay" as the basis of deficiency and to prioritize projects/corridors. Therefore, those segments of highway with the higher hours of delay will rate the

highest. In the near future, delays along this section of I-5 are not expected to be sufficient to rate a high priority. However, because it is a key corridor for tourism, freight movement, and general use, it is quite possible that the relative priority of this segment could move up.

Finally, despite the funding issue, a design configuration that preserves future options (in this case, I-5 widening) is needed to provide information to help WSDOT and local agencies preserve the right-of-way from intensified development. However, without available funds to purchase the required right-of-way little will be accomplished. It is recommended that WSDOT consider programming or dedicating some funds for long term corridor preservation projects, such as the preferred I-5 Widening Project in Central Skagit County. At the time of this report, this longer-range look toward corridors, and the 50-year life of bridges, makes preserving right-of-way for widening I-5 a very strong consideration.

LOCAL AGENCY ACTIVITIES

Local agencies should continue to play an important role in shaping the future transportation system in Skagit County and particularly along the state facilities, such as I-5, SR 20, SR 536 and SR 9. The Skagit/Island RTPO, local cities and Skagit County's continued involvement and support for regional transportation improvements can influence the priority of state projects and obtain needed funds. These agencies should update the Skagit-Island Regional Transportation Plan (RTP) and revise their local Transportation Improvement Plans (TIPs). These updated plans can be used as tools to show technical staff and the legislature the importance of these improvements for the state's overall economy and commerce as well as for the region's quality of life. These local agencies should also work with WSDOT to identify funds to conduct the recommended detailed studies that refine the preferred corridor alternative and identify right-of-way needs of the preferred alternative. With this detailed information, the local agencies can refine their own regional and local transportation and land use plans.

Several members of the public have expressed concern that there was a clear need to improve mobility for Mount Vernon residents to travel around the city, particularly in an east/west direction. Others stated that access problems and heavy traffic on arterial streets were cited as creating mobility difficulties for residents. While others expressed concern that the basic roadway system in the area hasn't been substantially changed, the population and number of trips on these roads have increased rapidly. Although, these issues and concerns are not directly part of this study, they should be investigated as part of the cities' and county's comprehensive transportation plans.

Furthermore, the cities and county should review the impacts and benefits from the Arterial By-pass Alternative. This alternative concept did improve local mobility by adding needed capacity to meet part of the increasing traffic demand. This is especially important for trips crossing the Skagit River. A new structure to the east of the new Riverside Bridge along Old Highway 99 could relieve some of the expected congestion in that corridor. Local area planners should consider all or portions of this alternative in developing and updating their comprehensive transportation plans for the area and region.

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